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AGERÖD I:B – AGERÖD I:D

A STUDY OF
EARLY ATLANTIC SETTLEMENT IN SCANIA

BY
LARS LARSSON



Lund 1970

BONN A. R./GERMANY
RUDOLF HABELT VERLAG

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with a Contribution by Johannes Lepiksaar



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TO MY PARENTS

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A STUDY OF
EARLY ATLANTIC SETTLEMENT IN SCANIA

av

LARS LARSSON

fil kand, Ssk

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The study deals with settlement in Scania during the Late Maglemose Culture and aims at relating the results thus obtained with information about the Kongemose Culture.

Two settlement contexts from central Scania denoted Ageröd I:B and Ageröd I:D respectively were selected as a basis. The distance between the two sites amounts to some 25 m. Ageröd I:B is part of a prehistoric beach and its finds extends over approximately 200 m² while Ageröd I:D rests on organic sediment and covers 50 m². One of the main problems is how differences in location and find distribution existing between the two settlements should be interpreted. The question is examined from various angles. By analyzing artefacts, C 14 determinations, pollen and osteological remains the two settlements are compared with each other and, on the other hand, with other Late Maglemose settlements. This offers an opportunity for studying both a local perspective, namely Scania, and a regional one, namely Scania-Denmark.

In order to get as realistic a picture as possible the physical environment of the period in question is reconstructed. Searching for reasons of changes occurring in settlement pattern, the reciprocal effect on each other of man and his environment are examined. This leads to hypotheses which form a model of the make-up of Late Maglemose settlement. In conclusion the results of the investigation

Referat skrivet av
förf. are compared with available information concerning the Kongemose Culture evaluating both differences and similarities existing between the two cultures

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PREFACE

The scope of this thesis, which is concerned with the cultural development of the Late Maglemose Culture in Scania, was conceived in the autumn of 1970. The study is based on two bog settlement contexts, denoted Ageröd I:B and Ageröd I:D, which are located in central Scania.

In the years 1971-1974 several investigations of the settlement complex Ageröd I were carried out. Most of the work concentrated on the settlement site Ageröd I:B, while a number of minor investigations were conducted at nearby sites.

Finds that were uncovered in the course of the excavations, as well as those preserved from the investigations led by Docent Carl-Axel Althin at the end of the 1940s, were subsequently examined during the years 1975-1976.

In the meantime, I undertook journeys to Denmark, Poland, the Netherlands, Great Britain and France for comparative studies.

The main body of the book was written in 1976-1977.

I am deeply indebted to all those who contributed to the realization of my task and I have to thank, first of all, Professor Berta Stjernquist who helped me greatly with her skilful guidance and her positive criticism. I also wish to express my gratitude to Professor Mats P. Malmer whose advice and support was particularly valuable to me in the initial stages.

Discussions with and advice from Lector Søren H. Andersen. Århus, Lector Erik Brinch Petersen and Docent Stig Welinder, as well as discussions at the seminars held at Lunds universitets historiska museum had an essential impact on the final form of the study.

A large number of co-workers, none named but none forgotten, helped me with the field-work, and to those I am greatly indebted.

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V. Nöbbelev, October 1978

Lars Larsson

LIST OF DEFINITIONS

Atlantic period: pollen-zone in Scania extending from the empirical limit of the linden to the elm decline.

Early Atlantic period: pollen-zone from the empirical limit of the linden to the increase of the hazel.

Late Atlantic period: pollen-zone from the increase of the hazel to the elm decline.

Barbed point: bone point provided with barbs spaced at intervals of 0.8 cm or more.

Blade: artefact with a length of at least twice the width.

I: blade with a length of more than 5 cm.

II: blade with a length of 5 cm or less

III: blade with a length of less than 5 cm and a width of less than 1 cm. Also called micro-blade.

A: blade with at least one whole ridge and a thickness of less than 1 cm. A whole ridge is a ridge without division running at least half the length of the blade.

B: blade without a whole ridge or a thickness of at least 1 cm or both.

Blade fragment: artefact with parallel or converging edges and with traces of one or two breaks perpendicular to the edges. The distance between the edges is more than 1 cm. Ridges parallel to the edges are also documented.

Similarly to all other artefacts the proximal end is the end with the bulb of percussion. The opposite end is called the distal end.

Blade knife: blade or blade fragment with an angle of the end retouch measuring less than 60°.

1: blade knife with a retouch running less than half the artefact's length.

2: blade knife with a retouch running at least half the artefact's length.

Blade scraper: blade or blade fragment with an angle of the end retouch measuring 60° or more.

1: blade scraper provided with end retouch only.

2: blade scraper with both end retouch and side retouch.

a: convex end retouch.

b: straight end retouch.

c: concave end retouch.

Bone chisel: artefact with an edge measuring more than 0.5 cm in width.

Boreal period: pollen-zone in Scania from the increase of the hazel to the empirical limit of the linden.

Early Boreal period: pollen-zone from the increase of the hazel to the rational limit of the alder.

Late Boreal period: pollen-zone from the rational limit of the alder to the empirical limit of the linden.

Borer: artefact provided with a retouch forming a slender point.

1: blade borer.

2: micro-blade borer.

3: flake borer.

a: borer with the two retouched sides converging evenly.

b: borer with a marked division between the body and the beginning of the slender point.

Bulbar flake: artefact with a length of less than twice the width and with a bulb of percussion.

Bulbar splinter: a bulbar flake with a length less than 1 cm.

Burin: artefact with a cutting edge struck by one or several blows.

1: burin with a cutting edge at or close to the long axis. Also called centre burin.

Angle burin: burin with a cutting edge at or close to the edge.

2: angle burin with one platform only, against which percussion was directed. See fig. 54.

3: angle burin with two opposite platforms, against which percussion was directed.

I-IV: number of dressed cutting edges on each burin.

a: cutting edge shaped by one or two spalls struck from the platform made by a break or retouch.

b: cutting edge shaped by secondary dressing by striking spalls in the same plane as the platform. Also called diahedral burin.

c: cutting edge shaped by directing a blow perpendicular to the long axis. Also called transverse burin.

d: cutting edge shaped by striking three or more spalls from the platform made by a break or retouch. Also called polyhedral burin.

Burin spall: blade with a marked triangular cross-section or a trapezoidal cross-section with traces of a former cutting edge.

Core: artefact which has no bulb of percussion and shows negatives of at least two flakes or blades.

A: core which shows negatives of at least two blades. The angle between the platform and the working face is exceeding 90°, and it exhibits blade negatives which are traceable from the platform to the top of the core. The height measured from the platform to the top is more than twice the length of the platform.

1: core with one platform.

2: core with two platforms.

B: blade core without the conditions of an A-core. Sub-division as for A-cores.

C: core with negatives of at least two micro-blades.

I: micro-core with traces of negatives at the end of the platform. Also called handle-core. The so-called keeled scrapers are also included in this type of core.

a: one working face, b: two working faces.

II: micro-blade core with negatives over more than half of its circumference.

III: micro-blade core with negatives over less than half of its circumference. The negatives are placed parallel to the long axis of the platform.

Core axe: core shaped into an edge or a point.

1: symmetrical adze with two working edges. The adze can be divided into two symmetrical halves by a line drawn perpendicularly to the edge.

2: symmetrical axe with two working edges. Two symmetrical divisions can be made through the axe, one perpendicularly to the cutting edge and another in the direction of the cutting edge.

3: asymmetrical axe or adze with two working edges. No symmetrical division can be made through the axe or the adze.

4: atypical axe or adze with one, three or more working edges.

5: unclassifiable axe or adze.

6: pecked axe.

a: unspecialized cutting edge. One or two spalls struck from the edge in the direction of the long axis.

b: specialized cutting edge.

0: unspecialized cutting edge with traces on one side of trimming for sharpening a previously dull edge.

I: cutting edge without further trimming.

II: cutting edge with trimming on one side in the direction of the long axis.

III: cutting edge with trimming in the direction of the long axis on both sides.

Flake: artefact with a length of less than twice the width and without a bulb of percussion.

Flake axe: axe made of a bulbar flake or a flake and where one side of the cutting edge consists of the ventral side of the flake.

1: axe trimmed perpendicularly to the dorsal side.

2: axe trimmed perpendicularly and parallel to the dorsal side.

3: axe trimmed in other ways than 1 and 2.

4: unclassifiable axe.

a: trimming from the dorsal side.

b: trimming from the ventral side.

c: asymmetrical trimming.

Flake scraper: bulbar flake or flake provided with a retouch of more than 0.3 cm in height and longer than 1 cm.

1: flake scraper with retouch at the distal end.

2: flake-scraper with retouch between proximal and distal end.

3: flake scrapers with retouch running the whole length of the edge.

Flint with incisions: flint provided with incisions on the calcareous crust. The flints are divided into four groups of patterns:

1: two groups of parallel lines crossing each other, whereby four-sided figures are formed.

2: parallel lines.

3: lines that do not cross each other.

4: lines crossing each other without any visible system.

Kongemose Culture: period extending from the point in time when more than 50% of the microlith in Denmark and Scania were of the broad type up to the disappearance of broad microliths.

Leister prong: bone point provided with barbs spaced at intervals of less than 0.8 cm.

Maglemose Culture: period during which 50% or more of the microliths in Denmark and Scania are narrow types.

Late Maglemose Culture: period from the introduction of handle-cores to the point in time when less than 50% of the microliths used were narrow types.

Micro-burin: waste products of the micro-burin technique, divided into narrow micro-burins with a width of less than 1 cm and broad micro-burins with a width of 1 cm or more.

A: produced when the percussion bulb was detached.

B: produced when the distal end was detached.

C: micro-burin with a second fracture on the end opposite to the intentional fracture.

D: shortening of a triangle microlith with a left-oriented retouch of side A.

E: shortening of a triangle with a right-oriented retouch of side A.

F: as A but where the break occurs above the intended point.

G: as B but where the break occurs above the intended point.

Microlith: artefact produced when applying the so-called micro-burin technique. This technique consists of parting an artefact by weakening it with a concave retouch and then break it. The result

will be a microlith and a micro-burin.

Narrow microlith: microlith with a width of less than 1 cm.

Triangle: narrow microlith with three sides A, B and C. See fig. 32.

1: isosceles triangle.

2: scalene triangle.

3: scalene triangle, one side being at least twice as long as the other.

4: triangle of Svaerdborg type, one side is at least three times as long as the other. The base is at least four times as long as the width.

5: scalene triangle, one side being at least four times as long as the other, the base is at least four times longer than the width.

Another typology of triangles was also used as a means of correlation, using the percentages of l_1 in relation to the length. See fig. 32: 40-45%, 44-40%, 39-35%, 34-20%, 19-15% and 14-0%.

In this typology a triangle of Svaerdborg type has a percentage of l_1 not exceeding 14 and a width of no more than 0.5 cm.

6: lanceolates.

a: lanceolate with partial retouch on one side.

b: lanceolate with retouch completely covering one side.

c: lanceolate with partial retouch on both sides.

7: narrow trapezes.

a: narrow trapeze with retouch on the two short sides.

b: narrow trapeze with retouch on all sides except the longest side.

8: segment with one straight and one concave side.

Position of retouch on the triangles:

a: no retouch on side B.

b: retouch covering the entire length of side B.

c: partial retouch covering more than 50% of side B.

d: partial retouch covering 50% or less of side B.

I: no retouch on side C.

II: retouch covering the entire length of side C.

III: partial retouch covering more than 50% of side C.

IV: partial retouch covering 50% or less of side C.

Broad microlith: microlith with a width of 1 cm or more. See fig. 39 and fig. 40.

1: broad trapeze, the two retouched sides B and D facing each other symmetrically. The length of the shortest unretouched side C should not exceed half the length of the unretouched side A.

2: broad trapeze, the two retouched sides B and D facing each other symmetrically. Side C is at least as long as one half of side A but shorter than the distance between the two unretouched sides.

3: broad trapeze, the two retouched sides B and D facing each other asymmetrically. A triangle is formed by side B, the maximum distance between the retouched sides (W) and a section of side A. Its shortest side exceeds $1/6$ of W.

4: broad trapeze, the two retouched sides facing each other asymmetrically. If a triangle is formed as above, the shortest side is shorter than $1/6$ of W.

5: broad trapeze, the two retouched sides facing each other asymmetrically. If a triangle is projected towards side C, its shortest side exceeds $1/6$ of W. Also called oblique arrowhead.

Middle Mesolithic: period from the beginning of the Late Maglemose Culture to the end of the Kongemose Culture.

Percussion stick: antler tine provided with cutting marks at the broader end and with traces of wear at the other end.

Rectangular artefact: blade fragment provided with frictional retouch on at least two diagonally opposed corners.

Rejuvenation flake: bulbar flake or blade, including detached parts of platform and working faces, split from cores in order to facilitate further flaking.

A: rejuvenation flake with its major part consisting of part of the platform, its minor part consisting of part of the working face.

B: rejuvenation blade having equal parts of both platform and working face detached. Also called ridged blade.

C: rejuvenation flake, its minor part consisting of part of the platform, its major part consisting of part of the working face.

D: rejuvenation flake having the entire platform detached.

Retouch: row of negative scars.

Deliberate retouch: continuous row of negative scars whose relative length, measured at right angle from the cutting edge, should not deviate more than 25% from the length of the longest scar. This relation is relevant for a length interval of the edge of 1 cm.

Frictional retouch: rows of negative scars not satisfying the condition for deliberate retouch. Also called retouch of wear.

A: Deliberate retouch with a length of 3 mm or more.

B: Deliberate retouch with a length of 1 mm or more.

C: Deliberate retouch with a length of less than 1 mm. Also called micro-retouch.

D: Frictional retouch on one side of the edge. Also called scraping retouch.

E: Frictional retouch on both sides of the edge. Also called cutting retouch.

When recording the orientation of the retouch, the artefact is held by the end opposite to the retouch and with the dorsal facing upwards. If the retouch is running from the upper right to the lower left, it is left-oriented. If it runs from the upper left to the lower right, it is right-oriented.

Retouched blade: blade provided with retouch which cannot be classified into any of the artefact categories distinguished on morphological grounds.

Retouched flakes: bulbar flakes or flakes provided with retouch which cannot be classified into any of the artefact categories distinguished on morphological grounds.

Sharpening flake: bulbar flake with the remains of a cutting edge of an axe.

Splinter: a flake less than 1 cm.

Stone artefact: artefact made of mineral other than flint.

Stone axe: axe provided with an edge.

Oval pecked stone axe: relation width-thickness 90% or less.

Round pecked stone axe: relation width-thickness 90% or more.

Strike-a-light: blade or blade fragment provided with a frictional retouch measuring more than 4 mm in height.

ABBREVIATIONS

AA	Acta Archaeologica
Aarbøger	Aarbøger for Nordisk Oldkyndighed og Historie
Ale	Ale, Historisk tidskrift för Skåneland
BSPF	Bulletin de la Société Préhistorique Française
DGU	Danmarks Geologiske Undersøgelse
G. E. E. M.	le Groupe l'Etude de l'Epipaléolithique-Mésolithique
GFF	Geologiska Föreningens i Stockholm Förhandlingar
MLUHM	Meddelanden från Lunds universitets historiska museum
NAR	Norwegian Archaeological Review
PPS	Proceedings of the Prehistoric Society
SGU	Sveriges Geologiska Undersökning
AT 1	Early Atlantic
AT 2	Late Atlantic
BO 1	Early Boreal
BO 2	Late Boreal
GNM	Göteborgs Naturhistoriska Museum
NM	Nationalmuseet, København
PB	Pre-Boreal
SB	Sub-Boreal

I INTRODUCTION AND PROBLEMS

1. Previous research

1.1. Fieldwork in Denmark

The history of research on the Middle Mesolithic, that is the period on which the present study aims to throw light, is limited to the twentieth century. Extensive investigations of the so-called kitchen middens had been undertaken since the middle of the 19th century, and in the course of these archaeologists were able to distinguish by means of stratigraphic studies an older phase of the Stone Age.¹ But it was in the first year of this century that an investigation of a settlement in the Maglemose bog near Mullerup on Zealand radically changed the research situation.² This investigation brought to light a previously not identified artefact industry and widened the range of our knowledge about settlement localities considerably. Particularly the very careful way in which the investigation was conducted – quite unusual at the time – by recording the stratigraphy in detail and measuring the in situ positions of artefacts meticulously contributed to this end.³ Consequently the peat-bogs came to be considered even more as possible sources of information in regard to cultural development during prehistoric times, and this again led to an attempt to supervise and control the industrialized exploitation of the peat-bogs.

Intensified peat-cutting during the First World War resulted in new finds of bog settlements analogous to the one at Mullerup.⁴ Although Friis Johansen was under great pressure because of the peat-cutting his investigation of a settlement at Svaerdborg was fully as thorough as the one at Mullerup. All artefacts that were found were reckoned according to their horizontal position on the scaled plan of each square. The thickness of the various layers of soil was measured at each corner of each square metre.⁵ The results of this meticulous reckoning appear in the report only as a verbal description of the most important concentrations within the investigated area. As was the case with the majority of other bog settlements, the first step of excavation was the stratigraphic location of the cultural remains. Once sufficient information about the sequence of layers was obtained, the next step, the investigation of a fairly large area, was undertaken. The main objective of the method was to excavate a large number of artefacts and in this way obtain the largest possible amount of material to be used for placing the settlement in the chronological system. One of the methods applied at Svaerdborg and later in many other investigations was to separate the finished tools from the waste products and to discard the latter.

The results of the 1920s' archaeological activities were, on the one hand, more thorough information about previously investigated sites and, on the other, the addition of further settlements as elements of the ongoing archaeological discussion.⁶ When Westerby published his investigation of a site at Blocksbjerg on Zealand, the attention of the scientific community turned towards the coastal settlements and information yet to be gained from them.⁷ Other settlements similar to that at Blocksbjerg were identified in other parts of Denmark as well, for instance at Langø on the island of Fyn.⁸ A number of investigations of settlements on the seacoast were carried out during the 1930s and 1940s.⁹ Of great importance also was the fact that new excavations brought the cultural development in Jutland again to the fore.¹⁰ Simultaneously with increasing peat-cutting during the Second World War, a second period of intensive excavation activities began in the inland peat-bogs, e.g. the investigations at Aamosen.¹¹ These were at the outset only emergency excavations but developed in the course of events into a major project and were carried on for several decades. The area in question offered the possibility of undertaking a series of excavations of settlements within a peat-bog complex in close cooperation with geologists.¹² However, quite a few of the investigations were pressed for time because of the expansion of peat-cutting. When, after this period, peat lost its importance as a fuel material, the danger of continued destruction of archaeological material passed. On the other hand, another activity, namely the changing of bog lands into pasture and arable land through drainage, became a new menace. The destructive effect of desiccation on artefact-producing layers first became noticeable after a certain time. The scientists, then, had time to plan the necessary investigations meticulously. The resulting investigations of a number of Mesolithic settlements such as those in Aamosen, Draved mose, Ringkloster and Vedbæk were and still are carried out with clearly stated objectives.¹³ But although the practical operations on several peat-bog sites have been quite intensive, examples of fully comprehensive studies of the results are still rather scarce.

1.2. Fieldwork in Scania

Saraauw's survey was very detailed and attempted to make comparisons. This contributed to the well-founded suspicion that the sort of artefact assemblage and the sort of location which the settlement at Mullerup gave an example of was bound to exist outside Zealand too.¹⁴ Partly as a result of this "Torvmossekommissionen" was established in 1905 with the intention of documenting, inter alia, human activity in the bogs of southern Sweden.¹⁵ Saraauw's intuitions were confirmed by Almgren's and Hansen's investigations at Bare Mosse and Rosén's excavation in the bog at S. Lindved.¹⁶

During the 1930s and 1940s the interest aroused by the Mesolithic became mainly concentrated on central Scania. Even before the water-table of the Ringsjö lake was sunk in 1882-1883, several Stone Age settlements had been observed on the isthmus between the western and the eastern part of the lake. When the water table sank some 2-3 metres, several new, previously unknown settlements were found along the new shoreline. When a channel was cut for the Rönne river near Sjöholmen a find-producing culture layer was uncovered. This and other settlements around the lake were successively treated by Count Reventlov.¹⁷ In 1929 the amateur archaeologist C. Stadler gave a collection of archaeological remains to Lunds universitets historiska museum. It comprised a large number of artefacts found at a settlement located close to the Sjöholmen site described by Reventlov. The finds were judged to be important enough to incite a test investigation of the site, carried out in the same year. The culture layers turned out to be very rich in both flint and bone artefacts.¹⁸ The settlement was assigned a dating to the Middle Neolithic. There were, however, certain artefacts which were thought to reflect Mesolithic traditions.

The preliminary surveys which Stadler had begun on the shores of a prehistoric lake once constituting a third Ringsjö lake were continued during the 1930s. On the north-western periphery of the Ageröd bog, near the place which had once been the outlet of the Rönne river and situated on a morain ridge, Stadler discovered several settlements with finds of very ancient character. He then gave Lunds universitets historiska museum access to results of his preliminary surveys. The most interesting finds were gathered in a field belonging to the Ageröd estate and adjacent to the former shoreline. Agricultural activity in the same area in the bog also brought animal bones, some of them worked on the surface, to light. A merely superficial survey of the objects collected on the modern surface soon made it clear that they equalled Danish finds from the Ancylos period.¹⁹ Shortly thereafter, plans for a more extensive test investigation were drawn up, but had to be given up because of the outbreak of the Second World War. After the war, in 1946, a test investigation led by Carl-Axel Althin was conducted. A 60 m long trench was sent out from the ancient shoreline into the bog. Within a 20 cm wide section every artefact was stratigraphically recorded. The result of this meticulous working method came to form the basis of subsequent investigations.²⁰ The Ageröd excavations were in progress during four consecutive digging seasons in the years 1946-49. The keenest interest concentrated primarily on a settlement area named Ageröd I, where the investigations were carried on during all three years. Before the onset of these activities, Stadler discovered a number of new settlements. They were located in the north-western part of the Ageröd bog - and were named Ageröd III-VII - and in the western part of the Rönneholm bog of the same bog system - called Rönneholm I-III. Seven of these sites were excavated. Some of the diggings were merely test investigations, while others were carried on over a period of several seasons. The settlement at Sjöholmen, previously investigated during the 1930s, became the scene of excavations once more. The initially small team increased by degrees, finally forming the full-scale personnel of "Mesolitiska Laboratoriet". An important factor was that scholars from other branches of science, such as the Quaternary geologist B. Brorson Christensen and the osteologist H. Berlin, joined the project. The former had previously worked at "Moselaboratoriet" in the National Museum of Copenhagen and established a continuous exchange of information and experience between the two laboratories.

Unfortunately, the work of the various sciences did not follow parallel lines. A preliminary report on the archaeological finds was in existence as early as 1951, but was not printed until 1954.²¹ Althin's hopes concerning a publication entitled *The Earliest Scania* were never fulfilled. The work was to have consisted of an extended report on the archaeological material and its find assemblages as well as a geological and an osteological report.²² The Quaternary geological report had been given to the Quaternary geologist T. Nilsson in 1950, but other pressing work delayed the publication. The report appeared in print in 1967.²³ Berlin died shortly after making a preliminary survey of the osteological material and hence this was never published. But his identifications were catalogued, and several data in the present study are taken from this well-organized register.

In an attempt to shed more light on the stratigraphy of the Sjöholmen settlement, a new investigation was undertaken there in 1960 and a trench connected to the previously investigated area was dug. However, the result of this excavation has not been published.

Through B. Salomonsson's investigations during the 1960s, research on the Mesolithic carried on at Lunds universitets historiska museum came to be regarded as one of the most outstanding activities in the field in Scandinavia.²⁴ Welinder's field investigations, few in number but rich in details, led research

onto the path of studies which extended beyond the limits of purely chronological reports.²⁵

1.3. Structural outline

The aim of the present paper is to study the relationship between human activity and environment during the Middle Mesolithic. Human activity can be studied with the aid of artefacts and structures. The term artefact is applied to concrete evidence created by human agency, e.g. implements or waste-products. The term environment refers to a purely spatial concept, i.e. the physical environment.

Any reconstruction of man's activities is based on empirical material, that is to say on artefacts. In judging the relationship between artefacts and environment, part of a complete analysis consists of the reconstruction of the physical environment. Here, too, empirical material is available from the results of studies in Quaternary biology, geology and faunal history. By means of these elements it is possible to construct a model of the physical appearance of a given region. It should be pointed out, however, that there is a difference between the treatment of man's activities and the description of his environment. Most of the artefacts were identified or studied by the author himself, whereas the information necessary for the reconstruction of the physical milieu was provided by others working in different fields. Consequently, the author's source assessment, for that part of the paper, is limited to accepting the judgement of other specialists in their respective fields.

Two areas of the research in the Middle Mesolithic, namely the chronology and the problems concerning continuity or discontinuity, have been given special attention. The various opinions that have been advanced will be referred to here and will serve as a background for the questions raised by the author.

1.3.1. Chronology

Seen from the chronological point of view, the epoch called Maglemose Culture is the most important. The name originates from the settlement site Maglemose in west Zealand. But the extent of the real meaning and substance of the term "Maglemose Culture" has been quite varied, due to the individual opinions of scholars as well as to the historical perspective in which research in this field was viewed. Up to the 1930s the term covered all finds older than the Ertebølle Culture. But in the course of time it became obvious that artefact assemblages within the Maglemose Culture could show variation in appearance.²⁶

The chronological classification became possible when the technique of pollen-analysis was perfected. Although the method has been used before, it was only around the mid-thirties that sufficient precision was reached to make it really valuable for archaeological purposes.²⁷ Those typological variations which were summarized within the Mullerup and the Sværdborg group respectively came through the pollen-analyses to be regarded as local rather than chronological variations.²⁸ The hypothesis about artefact assemblages with pronouncedly local character was also confirmed when Mathiassen published his work about the so-called Gudenaa Culture in Jutland.²⁹

Fieldwork carried on during the 1940s formed the basis for new and more sophisticated period systems. Mathiassen presented a phase division for the Maglemose Culture which was supported by the Aamosen investigations.³⁰ The Mullerup group and the Sværdborg group, both previously regarded only as separate units, were now considered to be chronologically different. During the later part of the Boreal period two further stages, it was now said, would have existed simultaneously with the latter group. One later stage, too, was incorporated into Mathiassen's system. However, attention should be paid to the fact that to Mathiassen the term Maglemose Culture meant mainly a definition of the inland settlement in Zealand, a culture which successively became influenced by population groups of the coastal regions of Zealand and Jutland. Becker's division into five periods,³¹ on the other hand, was strictly chronological. He based his system on an early Maglemose Culture, divided into three periods, 1-3, and a later phase with two periods, 4-5. The border between Early and Late Maglemose Culture was established at the introduction of the handle-core. Three artefact groups, the single platform cores, the scrapers and the microliths were used for more minute distinctions. In the Late Maglemose Culture, which is important for the chronological part of the present paper, not only handle-cores but also keeled cores occur. As a chronologically binding element Becker used the various classes of triangle microliths. During period 4 they are asymmetrical, while during period 5 they turn more and more into isosceles triangles. Albeit Becker, when presenting his chronology, referred only to very preliminarily published reports on settlements, his period system has been used ever since in research on the Maglemose Culture.³²

Not until Althin introduced his division of the Mesolithic into phases and periods was there a Mesolithic chronology available to be applied to Scanian conditions.³³ Althin did not use the traditional terms for defining the various cultures. The period system could not, in his opinion, cover all aspects of the

matter in consistency with the Danish concept of the extent of the Maglemose Culture. It should be pointed out that Althin's work was completed before Becker published his chronology.³⁴ Althin nevertheless found appropriate parallels between his own period II and Maglemosian finds.³⁵ He divided period II into four phases a-d, each phase represented by a settlement type, of which b-d occur in Ageröd I. The basis for his division is more complex than Becker's, but likewise lacks clear definitions of chronologically binding elements. This is fully understandable, since the publication quite intentionally had an interim character. The last phase of period II, namely d, represented by the Ageröd I:D settlement type, is characterized by the occurrence of so-called broad trapezes. It is particularly remarkable that Althin has great difficulty finding representative examples of this last phase of period II in the Danish material.³⁶ On the other hand, he believes to be able to extrapolate artefacts belonging to period II:d from Danish settlement material with mixed artefact content. Confronted with the dating of Ageröd I:B, another settlement with trapezes, Althin expresses the opinion that the finds demonstrate obvious parallels with Ageröd I:D.³⁷ Nevertheless, certain differences, i. a. the more extensive settlement area as well as the location of the settlement, are interpreted as indications of a phase of longer duration than that of Ageröd I:D.

While the evolution of the Maglemose Culture became clearer step by step, the stage antedating the classical Ertebølle Culture also became better known through data gathered at newly found coastal settlements.³⁸ Even as this material increased, its chronological importance in connection with both the Maglemose and the Ertebølle Cultures was realized. These finds, then, were assigned a place in a culture which came to be known as the Early Coastal Culture.³⁹ The investigation of a settlement at Kongemose in central Zealand was an important contribution, since the site produced artefact material identical to that of the Early Coastal Culture.⁴⁰ Since settlements containing artefacts similar in nature have been found both along the coast and inland, the name Early Coastal Culture was replaced by the more neutral term Kongemose Culture.

A renewed engagement in the typological and chronological aspects of the Mesolithic is reflected in several publications in the second half of the 1960s. They were concerned mainly with the Early Maglemose Culture.⁴¹ The radiometric method gave research a tool for fixing absolute datings. Hence, it now became possible to test the relevancy of the established relative chronologies. The marked interest in the Mesolithic also resulted in publications of older excavations or revisions of such which frequently featured chronology as one part of a larger problem complex.⁴² Welinder's paper includes an earlier stage of the cultural evolution than the subject of the present paper. His demarcation between Early and Late Maglemose Culture is quite interesting from the chronological point of view. While Becker, in his periodization, uses the introduction of a certain type of artefact, i. e. the handle-core, Welinder makes use of the oldest records of an advanced blade industry, the so-called A-technique.⁴³ With the aid of the Scanian material Welinder proves that the two methods dividing the Maglemose Culture are not synchronous. The A-technique was already in use when the handle-cores were introduced.

In Brinch Petersen's comprehensive work about the Mesolithic, the Scanian complex is also fitted into Becker's Maglemosian chronology.⁴⁴ Brinch Petersen states that while Klosterlund in Jutland constitutes the oldest known Maglemosian site, Ageröd I:B and Ageröd I:D seem to represent the latest find within the same culture.⁴⁵

In studying the Maglemose Culture, and particularly its later phase, a considerable difficulty arises from the fact that several scholars did not make sufficiently clear what they actually term Maglemose Culture. Consequently the chronological and chorographic aspects are not paid as much attention to as would be desirable. It is quite difficult to follow the train of thought which brought about the periodization of the time span in question. The problem probably arose when attempts were made to trace a number of artefact assemblages of short duration while at the same time they were fitted into a larger chronological and chorological complex. The standpoints taken by the individual scholars will be easier to understand if one becomes familiar with their respective concepts of the Mesolithic's cultural evolution.

1.3.2. Continuity or discontinuity

One of the problems closely connected with the chronological treatment is what sort of standpoint the various scholars have taken in regard to continuity or discontinuity during the Mesolithic. Sarauw indicated a continuous evolution between the Mullerup settlement and the coastally based Ertebølle Culture.⁴⁶ Stjerna, comparing on the one hand the Mullerup finds with objects from the Baltic and, on the other, objects from the Ertebølle Culture, came to the same conclusion.⁴⁷ Friis Johansen's judgement in favour of continuity also rested on the same basis.⁴⁸ Friis Johansen, like Stjerna, reported on artefacts identical in type, but added that he believed to have found, in the early material, prototypes of what later on were to become the main artefacts of the Ertebølle Culture. Lindqvist, on the other hand, expressed the opinion that the difference between the earlier and the later phase was so essential that it did not allow the assuming of continuity.⁴⁹ As an explanation of discontinuity he advanced the hypothesis of a

migration into Denmark and Scania, while the practitioners of the older artefact industry, i. e. the bone culture, survived in other parts of the Scandinavian peninsula. Similar thoughts were advanced by Norwegian and German scholars.⁵⁰ Broholm was of the same opinion as previously were Sarauw, Stjerna and Friis Johansen.⁵¹ He emphasized that one should not draw too far-reaching conclusions from the fact that the Maglemosian sites were located inland, while those of the Ertebølle Culture occurred on the coast. Broholm did not exclude the possibility that coastal settlements of the former culture had existed and that the inventory of this now submerged material would show a greater resemblance to the Ertebølle Culture. Westerby followed similar trends of thought in pointing out the significance of the Blocksbjerg settlement as supporting the theory of an existing continuity.⁵²

Rydbeck led the discussion about cultural evolution into a new area in that he introduced the concept that the Mesolithic traditions of artefact assemblages could have survived even in Neolithic times.⁵³ He found confirmation of his theory in the finds of the Sjöholmen settlement. Lidén made one of the artefacts essential to Rydbeck's theory, the slotted bone point, the subject of intensive study.⁵⁴ He reached the conclusion that there was documentation proving that the use of this particular tool was limited to the Mesolithic. He also favoured, in contrast to Rydbeck, the concept of a common cultural evolution with branches situated both inland and along the coastline. Mathiassen, in his work on the Aamosen investigations, again dealt with problems concerning the cultural evolution during the Early Stone Age. He interpreted the Aamosen settlements as a continuous and local development having taken place during the Boreal and the Atlantic periods and showing impulses received from the coastal culture which developed in a parallel manner.⁵⁵ He supported his theory that an inland culture with Mesolithic traditions could possibly have survived in the Neolithic with the aid of his own published report on the so-called Gudenaa Culture on Jutland.⁵⁶ Althin, too, rejected Rydbeck's theory. He believed to be able to differentiate in the Scanian material the possibility of two cultures, one located inland and the other on the coast.⁵⁷ The former would antedate the latter, although allowance should be made for certain chronological parallels. Becker's reasoning went along similar lines.⁵⁸ The above-mentioned investigation of the Kongemose settlement in inland Zealand became a very important argument in the debate about the Mesolithic cultural evolution. This settlement was, on pollen-analytical grounds, considered to be contemporaneous with the latest phase of the Maglemose Culture.⁵⁹ The first C 14 datings also confirmed this assumption.⁶⁰ Studies of the artefact types and of the associations of these within the Kongemose Culture appeared to give further confirmation, in the opinion of certain scientists, of the two cultures having existed within the same regions without any trace of mutual influence.⁶¹ Subsequently the first radiocarbon datings turned out to represent not the Kongemose site at all, but rather a nearby Maglemosian settlement. Recent C 14 datings result instead in a much later dating.⁶² Therefore, recent research shows a tendency to give priority to the theory of an uninterrupted cultural evolution.⁶³ However, views on discontinuity connected with migration had been put forward in a manner different from previous theories, in the debate regarding the cultural evolution.⁶⁴ The most recent contribution, presented in the report on the Danish site Svaerdborg I, has again brought these problems to the fore in that it sees some phases of the Late Maglemose Culture as being synchronous with the Kongemose Culture.⁶⁵

The viewpoints that evolved up to now can be summed up in two models (Fig. 1). Model no. 1 illustrates the hypothesis of two distinct cultural complexes having existed simultaneously for a shorter or longer period in southern Scandinavia. They can be fitted into the framework of two different alternatives. The first of these presupposes that the Kongemose Culture contains in its cultural milieu traditions of the Maglemose Culture. At the same time it would also comprise products of a complex which could perhaps best be described as the Proto-Kongemose Culture.⁶⁶ The second alternative is built on the premise of a fully developed Kongemose Culture having existed parallel to the Maglemose Culture. Model 2 has room for only one single cultural complex which developed from the Maglemose into the Kongemose Culture.

2. Conclusive problems

In taking an attitude to the models established in the previous chapter, the decisive question is: what contributes to a structural change in society?

Taking stock of the issues dealt with so far, the physical environment is considered to be the one single factor which decides man's behaviour. Taken in the extreme, a specific community would be the result of a specific environment. Man as an individual is not limited to any one particular environment, but the community in which man is integrated ought to be adjusted to a specific ecological environment and so form an ecosystem. Should man's environment change either directly or through the individual's moving from one set of surroundings to another, the consequence would have to be noticeable in the artefact com-

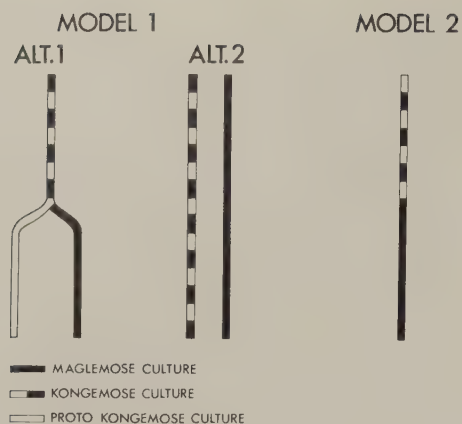


Fig. 1. The two main models of cultural development during the Middle Mesolithic.

position. However, we also have to consider that the dynamics of environment can act in various ways. Perhaps climate is to be considered primarily, since even moderate changes of this factor influence the food chain whose last link is man. But a change in the relationship between land and water, too, brings with it a change in the environment of man. Such a change can depend on an alteration of the coastline, or on the filling of water expanses by organic sediment. The alteration resulting from this latter process may seem insignificant in comparison with that caused by an alteration of the coastline. However, in the case of a society with a restricted scheme of moving capacity, the change can be very palpable. Quite probably there is a connection between alterations of the coastline and changes in climate, but in an archaeological study the two factors are best treated separately. They can cooperate locally and thus create, in one ecological niche, a perceptible change of the habitation, while other niches are affected marginally only. But other factors, too, could effect analyzable changes. Such factors might be demographic fluctuations, or impulses received directly or indirectly from the wider social environment. The latter can be defined as phenomena originating from a society outside the treated one.⁶⁷

The purpose of this present paper is to analyze the artefacts on one distinct and short phase of the cultural evolution during the Mesolithic within a single, limited environment. The results can then be correlated with findings from other regions and closely connected periods respectively.

Another question, which follows from the first, is this: which parts of the community become affected?

It can be assumed that the preserved artefacts do not reflect all the phenomena of a society to the same degree. Some can be documented quite well, while others left no durable traces. Also, every community has a certain amount of flexibility which, for a present-day student of a community, is impossible to gauge. Different parts of the community could supposedly have different degrees of tolerance for influences. It is important that the prerequisites for obtaining information on the artefact material of communities to be studied should be the same. If this is not the case then this circumstance must be subject to a particularly thorough critical examination of the sources.

The problem poses the following questions:

What were the social structure and the physical environment at a given point in time during the Late Maglemose Culture or the Early Kongemose Culture?

Which part of the community within the same limited area changes, viewed in chronological perspective, and how does this happen?

Does any other cultural context exist contemporaneously with the subject under study, and if so, what are the differences between the two?

Can contacts with a wider social environment be traced, and if so, which are the contact routes?

3. Delineation of the subject under study

The problem presented in the above chapter, followed by the requirements as to the material to be analyzed, does not allow a great number of choices.

The requirements can be listed as follows:

1. The material selected for study should come from more than one settlement site.
2. An extensive knowledge of the environment in which the artefacts were used must be available.
3. The settlement site must be dateable even by methods that do not depend on artefacts.

In addition to the established requirements there are also a number of objectives to be desired:

- I. The conditions for preservation should be good, in order to make it possible to study even organo-gene material and thus gain the widest possible range of information about human activity.
- II. In the same region as the material to be studied, there should be other settlements, of older as well as of later date.
- III. There should be information available on other settlements contemporaneous with the one to be studied, but situated in a different physical environment.
- IV. Connection between the object of study and other social elements, not directly connected with settlements, e.g. graves, should exist.

Anybody familiar with the discussion about cultural development during the Mesolithic will soon realize that a material satisfying all these desired objectives simply does not exist. The established requirements alone restrict the number of settlement sites to a minimum. Among those in southern Sweden only the settlements immediately next to the mouth of the Sege river in southwestern Scania and the Ageröd bog in central Scania qualify. The author of the present paper has analyzed both. Here, the latter area will be treated.

The two settlement sites Ageröd I:B and Ageröd I:D were selected because they not only meet the requirements but also satisfy objectives I and II. Both settlements are from the later phase of the Maglemose Culture. No clear-cut definition of this culture is to be found in the archaeological literature. Opinions, particularly about the extension in time as well as in space of the Maglemose Culture, are widely divided. Some scholars have solved the problem by simply setting aside this definition.⁶⁸ However, it would seem there is no advantage to be gained from giving up such an ingrained term. The culture differentiations in this thesis will therefore rest entirely on the basis of artefact composition. So as to get a firmer grip on the meaning of the term Maglemose Culture the author will define it by giving the percentage for the two main classes of microliths, i.e. broad and narrow forms respectively. The Maglemose Culture, then, is the time span during which the narrow microliths amount to at least 50% of the total number of microliths chorographically limited to Scania and Denmark. The Kongemose Culture, on the other hand, is the material culture in which less than 50% of the total number of artefacts produced by microburin technique consists of narrow microliths. The chorologic limits are the same as for the Maglemose Culture.

Ageröd I:B and Ageröd I:D have been dated by pollen-analysis to the transitional period between Late Boreal age and Early Atlantic age - BO 2/AT.⁶⁹ A chronological index for the pollen-zonal determinations to be used frequently will at the same time also set up the boundaries for the period to be treated here. The Quaternary biological chronology used in the present paper is based on Nilsson's pollen-analytical zonation system for Scania.⁷⁰ Two zones, namely the Late Boreal - BO 2 - and the Early Atlantic - AT 1 - zones are of special interest in this connection. Nilsson dates BO 2, its onset represented by the rational limit of the alder, to 6550 b.c.⁷¹ On grounds of later radiometric assays, however, this limit has been moved back two hundred years.⁷² An important factor in dating the Ageröd settlements is the subdivision BO 2 c within BO 2. Nilsson distinguishes it in all central Scanian diagrams, its characteristic being a substantial increase of the alder curve. However, the two radiometric datings show considerable variation, 320 years.⁷³ With these two lead datings Nilsson fixes level BO 2 c at 6350 b.c. Further contributions to a more exact dating are lacking, since the main levels within each pollen zone as Nilsson has established them are no longer used by recent Quaternary biological research - mainly because of their local character connected to Scanian material.

For the present paper, the most important zonal boundary is the transition period between the Late Boreal period and the Early Atlantic period, i.e. BO 2/AT 1. Nilsson identified the boundary with the empirical limit of the linden. It gives then the following datings:

Limhamn	5945 $\pm$ 115	St -720	Somewhat above the limit. ⁷⁴
	6040 $\pm$ 160	St -732	
Barsebäck	6430 $\pm$ 90	Lu -637 ⁷⁵	
Ageröd	6000 $\pm$ 85	St -1001 ⁷⁶	
Hallarum	5760 $\pm$ 150	St -1471 ⁷⁷	
Immeln	6060 $\pm$ 100	Lu -119	Somewhat below the limit. ⁷⁸
	5840 $\pm$ 100	Lu -120	Somewhat above the limit.

In Quaternary biological investigations of the South Swedish highland the same terminology has been used, but with a different definition. The boundary was in this case established at the absolute limit of the linden.⁷⁹ No published radiometric datings are known within the area from the actual zone of the boundary, but there is one reading from the upper part of BO 2 giving the value 6110 $\pm$ 100 b.c.⁸⁰

Except for the Barsebäck dating, the variation appears not to be significant. A synchronic increase in percentage of the linden in mixed oak forest from southwest Scania to Blekinge seems documented. On this basis, at a Nordic symposium held in 1974, the dating of the boundary BO 2/AT 1 was established at 8000 B. P.⁸¹

Based on an extensive variation of datings from Ageröd, Nilsson established the zonal boundary AT 1/AT 2 at 4400 b.c.⁸² In so doing, he points out that this date is considerably later - some 500 years later - than his previous calculations.⁸³ The chronological classification has then been re-examined by Digerfeldt.⁸⁴ He wanted to establish the transition AT 1/AT 2, by means of fresh radiometric datings and a calculation of the sedimentation speed ratio in the Barsebäck bog, to 5040 b.c., a dating well in accordance with Nilsson's earliest calculation. With the aid of the above cited results the following datings for zonal boundaries will be employed here; BO 1/BO 2: 6700 b.c., BO 2 C: 6300 b.c., BO 2/AT 1: 6000 b.c. and AT 1/AT 2: 5000 b.c..

BO 2, then extends over a period of less than 700 years, and AT 1 has a duration of 1000 years.

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II METHODS

4.1. Methods of investigation

During the more than seventy-five years that have passed since the first investigation of a Mesolithic bog settlement, a great number of settlements have been excavated. These investigations were initiated for various reasons, and their objectives were also varied and thus affected the final results in different ways.

The great majority of sites were not found through systematic reconnaissances, but were the results of cooperation between sharp-eyed peat cutters and amateur archaeologists who reported the finds to archaeological institutions and museums. The professional archaeologist was then confronted with the task of investigating a site which had already been more or less disturbed by peat-cutting. Consequently, the aim of the investigation, namely, to accomplish the investigation in the shortest possible time in order to avoid as much disturbance as possible through continued peat-cutting, was already staked out. Excavation methods were accordingly modified to suit size and stratigraphy of the individual sites.

In the bog complexes of Ageröd and Rönneholm no immediate threat of damage to the settlement area Ageröd I by peat cutting or drainage work was present, and thus there was a chance to carry out excavations without the pressure of any time limit, both during the 1940s and the 1970s. Therefore, the excavation could be organized more methodically, and experience from previous investigations made its planning considerably easier.

The excavations during the 1940s followed a special pattern. First, a trench was dug across the area which for various reasons could be assumed to contain a settlement. Next, a 20 cm wide bench, extending over the whole length of the trench was excavated and the position of each artefact both horizontally and vertically was meticulously recorded. The result of this reckoning became the basis of the stratigraphic division when the area to be investigated was extended. The finds were then separated into layers within each square metre.

The 1971-73 investigations were preceded by a close study of all documentation accomplished during the previous excavations. Journals were examined closely in order to gather data on the actual stratigraphy. The notations also proved valuable for tracing problems that had cropped up during the fieldwork and had not yet been solved satisfactorily. Prior to selecting a particular area which could be thought to contain relevant information, certain find categories were examined in respect to their stratigraphic and distributional pattern. These principles came to govern the selection of the area to be excavated not only during the first but also the following seasons.

The aim of the first excavation season (1971) was to clarify the vertical position of the artefacts in relation to the recorded stratigraphic sequence. To this end, the position of each artefact, in three dimensions, was recorded, at the same time maintaining the division into square metres. The vertical and horizontal position, the symbol of the square in question and a running number for each artefact, was recorded on a plan. The great advantage of this procedure was that artefacts originating from the disturbed parts of the area could be eliminated from the final list. The method is identical to that applied earlier in the documentation of the narrow profile shelves during the investigations in the 1940s.

Once a clear picture of the fundamental question of stratigraphic sequence was achieved, the investigation during the second and third season (1972-73) was somewhat simplified. The goal was to excavate a large contiguous area so that the find distribution might be studied. Certain preliminary test diggings and a thorough recording of the stratigraphy showed that the find distribution, as far as the levels went, was in agreement with observations made previously. The careful artefact documentation was limited to include those objects that according to previous study might have stratigraphic or chorologic significance. The position of the remaining material was transferred to field plans. In order to be able to find the position of each individual artefact later on, the objects were placed on a white, square board according to their original mutual position within each 0.25 m² and photographed. By this method the exact position of every artefact could be reconstructed later. Due to this somewhat simplified method a major contiguous area could be investigated within the allotted time and cost.

The above described excavation method, like the one used during the 1940s, is adapted to the requirements of the site. Similar methods had previously been applied, chiefly in investigations of Mesolithic settlements, on the Continent.¹ In spite of the lack of any visible stratigraphy, the method enables the researcher to study several aspects of the artefact distribution.

4.2. Type classification and type analogies

Malmer defined typology as being the discipline of types and their mutual relation.² This definition contains in fact two important elements. The first is the identification proper, also called type classification or element analogy, the second encompasses type analogy. Basic to all research on concrete things is the necessity to systematize the finds and thus create types which are then used in analogy conclusions of various sorts. These two moments have to be differentiated very carefully.

In American archaeology two methods for discovering existing types were developed. Swedish subject literature terms them rationalism and empirism respectively.³ Adherents to the former contend that a type classification enables the researcher only to systematize the remains of material culture. Proponents of the latter believe in the possibility of gaining insight into the principles of selection governing prehistoric man by establishing type classification. The rationally inclined scholar draws his borderlines in a given material based solely on his subjective premises. This strict differentiation, however, has no anchor in factual research. For no matter which of the two type classifications is put to use, the final goal will always be to arrive at a model of the prehistoric period under study through a detailed treatment of the find material.

In order to test such a model, it is very valuable if there is an actual situation similar to the prehistoric one, with which the type classification can be compared. Such comparisons between scientifically achieved conclusions and real situations have been undertaken by scholars.⁴ Paralleling does not necessarily have to be limited to form identity. One possibility within the typological framework is a classification according to traces of wear, based on practical experiments.⁵ The result may be a type classification which is contrary to most of the traditional opinions. But regardless of which method is used to classify the material, the prime demand must be that any type classification should be based on verbal definitions.

The typological classification to be presented here is based on the classical morphological principles of selection - scrapers, axes, burins et al. However, in a comparative work using various types, it is also important to know the functional aspects of these types. The problem of functional grouping was raised by Althin.⁶ He separates the artefact material into three groups, only one of which can be used in comparative studies. This would be the group containing artefacts which were used in the preparation of food and skins as well as those used for other activities necessary in the day-to-day life of a settlement. The other two groups would contain those artefacts that were necessary for gathering food and for manufacturing other implements. Thus, while scrapers may be used for comparative studies, arrowheads or burins may not. Such viewing of a find material is certainly very interesting but, as Althin himself points out, no certain classification can be achieved with it. Therefore, the author tried to gain as much knowledge as possible about the function of each type. In this, the study of traces of wear is particularly valuable. A stereomicroscope was used, a 20 x enlargement being the highest used for scanning eventual wear traces.

As far as possible, the type classification will be based on the extensive finds from Ageröd I:B. In spite of certain shortcomings, an extensive material has great advantages when classifying, compared with a site having a small number of artefacts.⁷ Working with material of the latter type, it is often difficult to decide whether two artefacts dissimilar in some respects should be classified together as variants of the same type, or considered two independent types. It is, in other words, difficult to clarify what exactly the individual differences in detail mean. The prehistoric knapper's work could hardly have been so stereotyped as to avoid some measure of variation in shape or proportion. Such variations do not always have to be deemed as chronologically significant. Dissimilarities in both resources of raw materials and quality must likewise carefully be taken into account before asserting chronological evaluations on the grounds of a typological treatment. Having a large amount of finds at hand, the researcher will also be better qualified to shed light on technical aspects. In processing a large number of artefacts, the chances of identifying material, technical and, most of all, proportional morphemes, are much better. Moreover, a quantitatively large material offers much better chances to gain insight into the process of manufacturing than would a restricted material. It is very important to understand the technical aspects of a given method of manufacture if we want to establish a type classification. This holds true primarily for the evaluation of individual typological morphemes. In an element-analogical treatment small settlement materials should therefore be disregarded in favour of larger ones such as Ageröd I:B. In the present type classification the smaller site Ageröd I:D will thus be set aside so to speak.

Type-analogical grounds for evaluations, dealt with primarily by Malmer and Gräslund, encompass exclusively problems concerning analogies and their value for the question of chronology.⁸ Although this particular field certainly is very important, this should not mean the exclusion of other possible analogical associations. The fact that certain artefacts show a marked distribution pattern within a given settlement area was considered by some researchers to have chronological significance.⁹ Others thought that it reflected a separation of various activities going on within the settlement - or drew societal conclusions on the basis of distribution patterns.¹⁰ By giving these examples, the author wants to point out that seve-

ral ways of looking at typological conclusions should be taken into consideration before a final assessment.

After having gained a wider scope of e.g. form variants or methods of manufacture by means of the extensive settlement materials, the minor settlements may hopefully be attacked from a somewhat altered view. It is imperative that such studies should be undertaken on settlements closely related in place and time. A comparison is highly dependent on the similarity of economic preconditions, resources of raw materials available and the like. For differences of these factors between two settlements may also result in differences of techniques of manufacture and thereby also different forms of implements.

4.3. Quaternary geological methods

Through Nilsson's extensive research pollen-analyzed stratigraphy from the Ageröd and Rönneholm bogs was available prior to archaeological excavations.¹¹ In 1964 Nilsson published a thorough stratigraphic analysis of the central part of the Ageröd bog.¹² This analysis made a dating of the Mesolithic settlements possible, in spite of the fact that in sections near the shore the stratification was often very compressed.¹³ He also presented another very important study, based on extensive pollen-analyses, about the formation of the Ageröd bog.¹⁴ The publication provides detailed studies about the changes in the water level of the prehistoric lake that have taken place from the Preboreal to the Subatlantic period.

The results of the Quaternary geological investigations will be used here for two differing purposes. With the aid of the pollen-analyses the chronological relationship between the various settlements in Scania can be studied. The pollen-analysis is of particularly great significance in distinguishing the settlement sequence within the northeastern part of the Ageröd bog.

Also the changes in the water level will be used in the chronological studies - mainly those of the prehistoric lake which once existed in the area consisting to-day of the Ageröd and Rönneholm bog complex. The changes in the water level also have a certain importance in dating the coastal settlements. There, transgression studies along the Scanian Öresund can contribute to our knowledge.

The second endeavour will be to try to reconstruct the physical environment with the help of Quaternary geological research. The relation of land and water, of different types of soil and the vegetational composition at a certain time can be distinguished from the results of this research.

In setting up the limits of the subject to be studied, one of the stated requirements was that the settlement material should also be dateable with other than archaeological methods. One such method is pollen-analysis, another one the C 14 dating. It is no exaggeration to say that radiometry is to-day the most important method in establishing Mesolithic chronology. Nilsson's publication in 1964 of a standard pollen diagram, combined with C 14 readings of samples taken from strata that are particularly interesting from the viewpoint of changes, makes it possible to establish the duration of the pollen-zones in much more detail than has been the case previously.¹⁵ Through continued intensive activity in this area Quaternary biological research in South Sweden has by now acquired a fund of knowledge which we feel fully justified to call unique in Europe.¹⁶

The circumstance that the Ageröd settlements were qualified for radiometric readings offered a very important complement to the pollen-analyses. The chronological treatment in the present paper will rest first of all on the basis of a combination of the results of these dating methods, since, in the opinion of the author, they build firmer grounds for chronological reasonings than could be obtained from the typological method. The aim was to take at least three samples from each settlement layer and, if possible, samples from different organic materials, so as to establish a maximally reliable series of radiometric readings. It was hoped that by this method misleading elements, which undeniably can exist in the material to be analyzed, would be reduced or explained.

If we stray too far from the environment represented by the zonal system, in this case Scania - and in some cases also adjacent areas - the correlation becomes very uncertain because of variable climatic conditions. In those areas where Quaternary biological methods of analysis cannot be employed, radiometric C 14 determinations are the only means for dating. Therefore, C 14 readings have had particularly great impact on comparative studies, most of all outside Scandinavia. However, it must be emphasized that the inaccuracy factor increases especially in the case of settlement sites from which there are but a few samples dated. Because of this, the aim was primarily to treat and interpret such settlement sites that possess an unequivocal stratigraphic sequence from which a considerable number of C 14 readings are available. Other types of finds have then functioned as complements to connect the well-dated settlements which, taking everything into consideration, still constitute an insignificant portion of the total sum of human activity during the Mesolithic.

In accordance with the directives proposed at a C 14 meeting at Cambridge in 1962, all C 14 readings will be accounted for here with the half life of 5568 years.¹⁷

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III DESCRIPTION OF SITES

5. Topography

The investigated areas are located on the margin of Ageröds Mosse and on the Ageröd estate in the parish of Munkarp, in central Scania. Ageröds and Rönneholms Mosse together form a northwesterly arm of the Ringsjö basin whose bottom is approximately 25 m deeper than the surrounding terrain. The whole bog complex which, with its total acreage of 12 square kilometers, is one of Scania's largest, is in fact one single bog. It indicates the extent of a prehistoric lake, the third such lake within the region of the Ringsjö, that has been filled by organic sediment to become ultimately transformed into a raised bog. The Rönne river, the main drainage of the Ringsjö lake system, divides the basin into a smaller northern part, i.e. Ageröds Mosse, and a southern larger part, i.e. Rönneholms Mosse (Fig. 2).

The area in and around the Ringsjö basin consists of morains deposited by the so-called North-eastern ice stream, but also of sediment deposited by glacial lakes dammed up by both the North-eastern ice and the so-called Low Baltic ice, although the latter has not exercised any direct influence on central Scania.¹ There are two main types of bedrock in the northwestern part of the Ringsjö basin. The result of this is that the upper layer of soil appears in two different compositions, their expanse divided by the Rönne river.² In the north the bedrock consists of primary rock, and consequently the topsoil layers have the character of primary rock morain, described as being practically free of clay. They are gravelly, sandy and silty with an abundant admixture of stones and boulders. In the south the bog complex rests on a bed of Silurian slate and this too is reflected in the upper stratum. Throughout, the morain is mixed to a considerable degree with stone and gravel. It differs from the purely primary rock morain in that it contains weathering debris of the Silurian slate and is therefore rather clayey and also calcareous. In Rönneholms Mosse calcareous gyttja overlies the Late Glacial sediment, while strata of the same age in Ageröds Mosse usually consist of fine detritus gyttja.³ Through peat-cutting and intensive drainage the bogs have lost their former character of raised bog. This happened mainly in their northwesternmost part, i.e. around the area of our investigation (Fig. 3). This part of the bog appears to-day as a transition without break from solid ground to an area almost completely flat, with organic deposits. It is put to use primarily as pasture, but also for tilling. The prehistoric shoreline is for the mose part marked by morain ridges. In certain restricted areas, as for instance in the immediate vicinity of the scene of the investigation, glaciofluvial sand deposits are present.

6. Section B

Section B is separated from Section HC in the west by a stone fence running at right angles to the bog (Fig. 4). As is the case with large areas of the westernmost arm of the Ageröd bog, here too the transition from solid ground to bog is marked by a stretch of land with a large number of boulders. These boulders, probably demarcating a Late Glacial shoreline, sometimes reach a size of 2 x 2 m.⁴ Unlike Section HC, where the bouldery ground continues, rising evenly, in large parts of Section B it forms a bank. The height of the bank, in relation to the area lying behind it, varies between 0.75 and 0.40 m. No organic deposits could be identified in the area beyond the bank, but it is now waterlogged to such an extent that a few reed populations have taken root. Large parts of this area are under water during the winter months. Beyond this fen bounded by the bank, the ground rises evenly and forms a distinct hillock, its 4 m high crown - reckoned from the bog surface - being 150 m north of the prehistoric shoreline. The map of fig. 4 with an equidistance of 0.5 m does not show the area beyond the bank as a totally enclosed body. The reason is simply that the bank lies, for a short stretch, below the level 55.5 m above sea-level.

There is no demarcation in the east, but at a distance of 25 m from the origo point of the section the bouldery zone changes from having been a definite bank marking the shoreline to again becoming part of an even slope. The boundary line in the south is marked by a ditch which formerly was the borderline between the intensively cultivated bog and the shore zone used extensively as pasture.

In 1946 the position of the artefacts within a 60 m long trench - A - oriented at right angles towards the prehistoric shoreline, was recorded. Most of the excavation season in 1947 was taken up by digging two new trenches - B and C - to clarify the distribution of the artefacts within another part of the lakeshore.⁵ Trench B was cut somewhat obliquely from the margin of the lakeshore and was followed by the

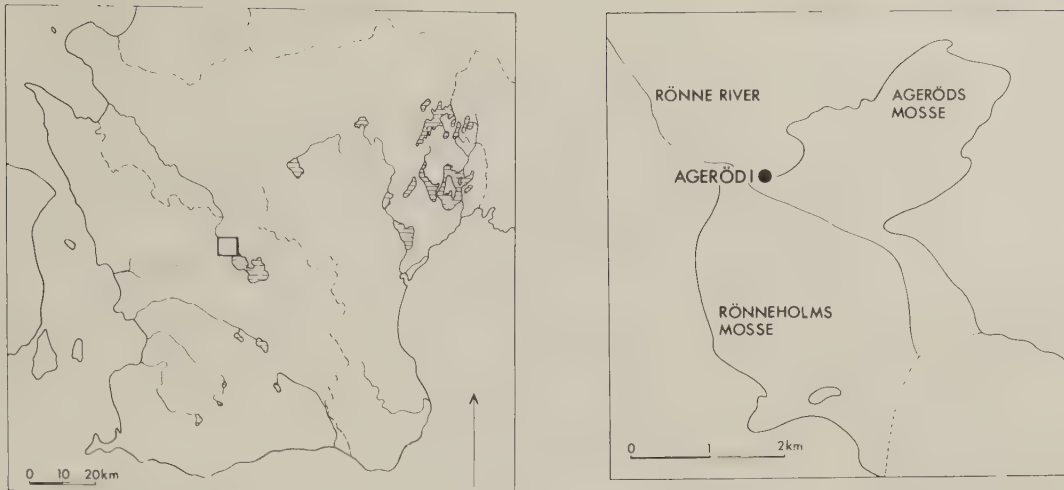


Fig. 2. Map of Scania showing the location of the bog complex of Ageröds and Rönneholms Mossar. The location of Ageröd I in the relation to the bog complex is shown on the right.



Fig. 3. Ageröd I. View of the investigation area from the south-west overlooking Section HC in the foreground and Section B plus Section D in the background. The photo was taken in 1947. Since then trees and bushes have grown tall enough to obstruct this particular view.



Fig. 4. Ageröd I. Map showing the investigation area and its vicinity. The contours are marked by altitudes above sea-level.

examination of horizontal distribution of a 20 cm wide bench. A layer blackened by soot and charcoal was recorded on the very first day of excavation. For a stretch of 9 metres this layer contained abundant quantities of cultural artefacts and a widening of this part of the trench seemed justified.

The extended area spread over 22 square metres (Fig. 5:A). The stratigraphy appeared as follows:⁶
P. 48

0 - 27 cm	Humus
27 - 39 cm	Strongly humified peat with gyttja content. AT 1?
39 - 51 cm	As above, but sandy.
51 - 62 cm	Culture layer with substance as in the overlying layers.
62 - 92 cm	Sandy gyttja. BO 1 to early part of BO 2.
+	Morain

A partition into two vertical sequences of the culture layer within a few square metres of the excavated area was especially interesting. In order to obtain further information about his newly recorded find concentration, the following year, i.e. in 1948, a number of test trenches were cut east of the main Trench B. As learned by experience from previous test excavations at Ageröd I, the trenches were cut parallel to the former shoreline. Since this line appeared to have a decidedly concave shape in the eastern part of Section B, several short trenches were cut there laterally, spaced one or two metres from each other. Only one shorter trench was cut across. As the thickness of the culture layer decreased, so did the flint density. In the easternmost trench the black layer disappeared completely.

The discovery of a settlement - Section D - in the bog south to Section B tended to complicate the picture, particularly since artefacts have been recorded, if only sporadically, between the shore and the occupational area of Section D. Thus, during the winter 1948/49 various conjectures about the real nature of Section B were discussed. One possibility was that it would represent the traces of a settlement located on the beach. Another theory, advanced by Althin, and partly based on the fact that the culture layer at

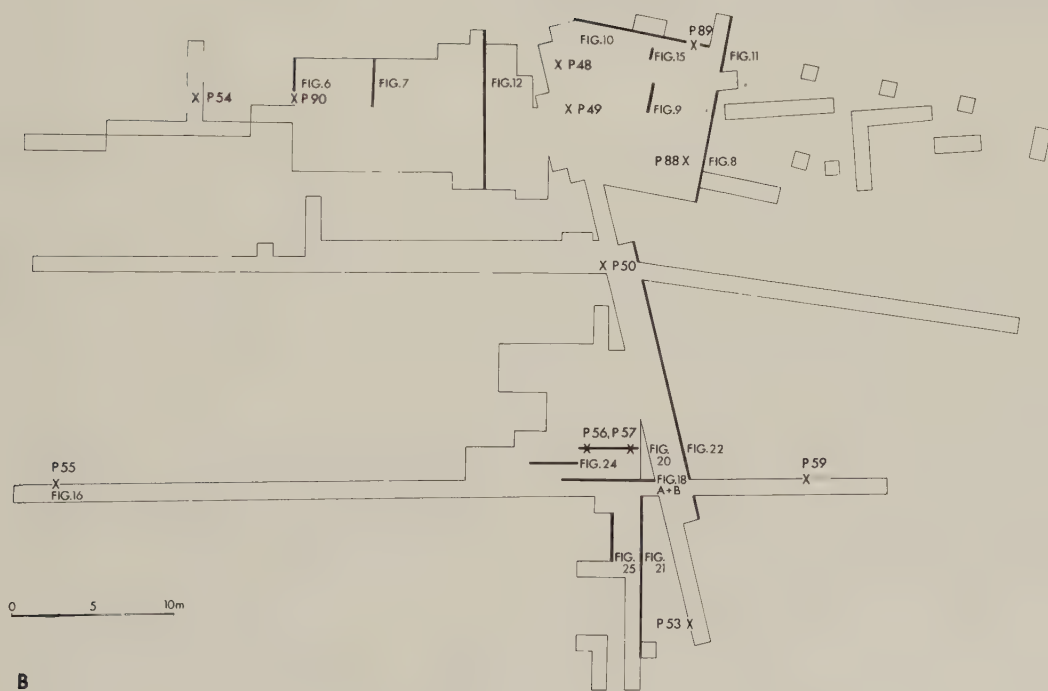


Fig. 5. A: Excavated areas of Section B and Section D. The hatched area was excavated 1971-73. B: Excavated areas as above with transects and test points, illustrated and described in this study.

one place was divided into two strata, held that artefacts found in the lakeshore zone actually stem from an artefact-producing layer originally deposited in Section D. Ice-pressure would have moved this layer over to the beach where it was then left by the melting ice. The large number of unanswered questions in connection with Section B made a third excavation season well motivated. In 1949 interest focused on the western part of Section B. The trenches were laid out in the same way as during the previous year. At the same time efforts were made not to divide the excavation area into too many separate units, and so facilitate a general survey of the stratification. It became quite clear that the settlement layer was not any direct extension of the find-producing layer of Section HC. Find density decreased simultaneously with the thickness of the culture layer which was entirely absent in the westernmost square metres. A cross trench cut with the intention of studying the find distribution above the shoreline had the following strata⁷: P 54

0 - 42 cm	Weathered gravel
42 - 72	Black culture layer
72 - 98	Sandy gyttja. Earlier part of BO 2
+	A thin layer of sand between the gyttja and the morain.

This last season's investigation convinced Althin that Section B incorporated a settlement different from both the settlement in Section D and the settlement complex in Sections HC.

During the years 1971-1973 investigations were concentrated on examining large and connected areas, primarily in Section B. Fig. 5:A illustrates the relationship between these and the previously excavated areas. One of the investigated spots east of the main Trench B lies at an angle to the trench that was cut during the 1940s. The explanation for this is that it was quite problematic to find the previously excavated areas again, since they lack a fixed starting-point with Section B. Some 10 square metres had to be uncovered before the old trenches were found again. Therefore, in the course of further investigations, the established system of coordinates was followed.

Investigations in 1972 and 1973 focused on a 15 m wide area immediately west of the main Trench B. The new trenches were laid out according to the system of coordinates used during the 1940s. However, it proved impossible to determine the exact position of the previously examined areas, since a landslide seems to have changed the shape of the walls before the trenches were filled up again. As a consequence, the individual square metres were dislodged 0.5 m away from the system of coordinates originally established in the 1940s. A further complication is that the trenches cut in 1948 and 1949 are not at right angles to Trench B, nor are they parallel to each other.

6.1. Stratigraphy

The find-producing part of Section B is located on the southern side of the bank which appears to connect up directly with the morain bed of the bog. However, the surface of the morain does not slope evenly towards the deeper parts of the bog. Close to the base of the bank the lake bed begins to rise again and reaches its highest point approximately 10 m south of the prehistoric shoreline. The difference in altitude amounts to 30 cm. From here on the lake bed slopes evenly towards the bog's centre. The dip next to the base of the bank might be the result of shore erosion. When this supposed erosion took place cannot be stated more precisely than that it occurred prior to the Early Boreal period, when organic sediment filled the dip.⁸ The organic deposits in other parts of the lake bed date from the Late Boreal period. In several trenches close to the bank a stratification with sand strata which partly overlay zones of organic matter was observed. One such sequence exists i. a. in the transect illustrated in fig. 6. In this particular transect the overlay occurred within a 25 cm wide stretch, but in other parts of the excavation area it may spread considerably wider; maximally up to 1.5 m. The widest expanse of overlying minerogene matter occurs in those sections of the bank which slope at the sharpest angle. This observation offers an important clue towards the solution of the phenomenon. It seems likely that the bank suffered erosion and the minor filaments in the bank's mantle slid down the slope and in parts covered the bottom deposits. This took place before human activity began in the region.

The excavation in 1971 was led along the bank up towards the top of the bank, and for the rest of that season the trench was left open. This caused an erosion of the bank. The thickness of the sliding matter amounted after two months to a maximum of 10 cm. Hard rain lasting a couple of hours increased the erosion layer by up to 5 cm. The above-mentioned interpretation of overlay presupposes a period of decreasing undergrowth during the Late Boreal period due for example to a progressive rise in the water level of the prehistoric lake. Nilsson holds that he has found proof of this in the stratigraphy of Section HC.⁹ It may be added that certain parts of the organic deposits consist of more or less sandy material in part overlain and in part underlain by purely organic layers. This is particularly evident in transect fig. 6, where the fine detritus gyttja as well as the coarse detritus gyttja partially contain minerogene

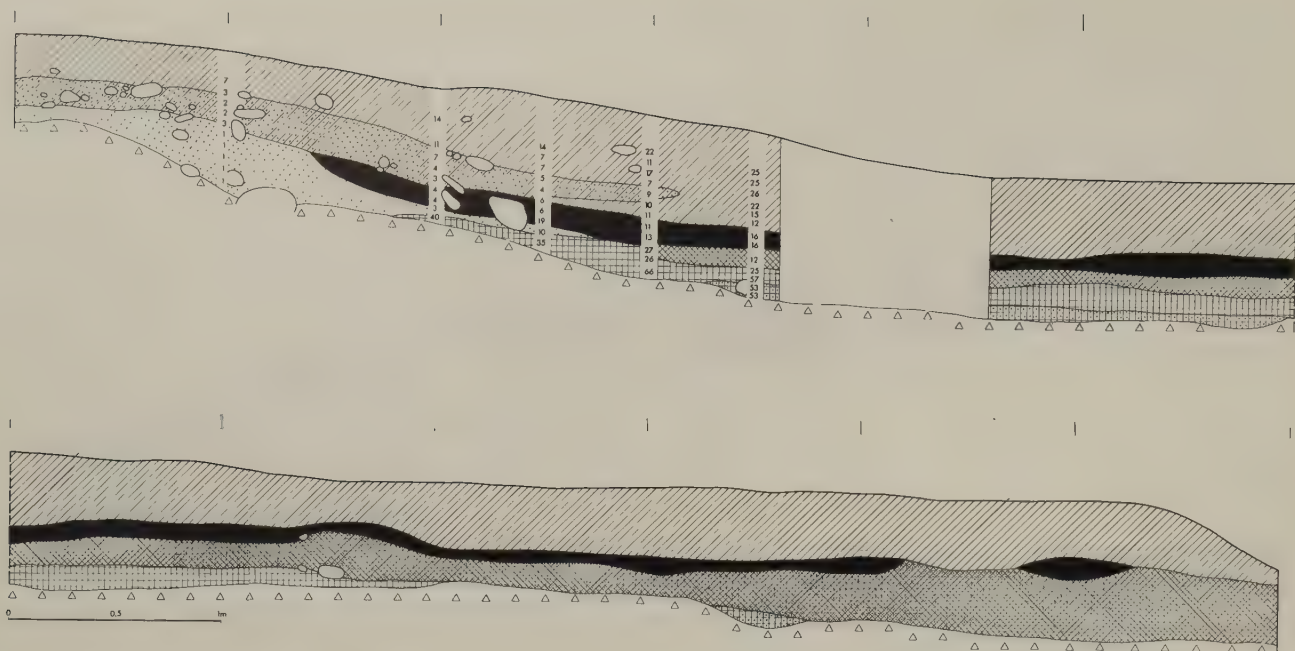


Fig. 8. Ageröd I:B. Transect through the excavated area from the top of the bank and into the bog. The figures illustrated are the percentages of organic components according to the loss of ignition analysis.

admixtures. The interruption in the layer sequence, as given above, indicates that some sort of displacement had taken place before the culture layer was deposited. In transect fig. 7, taken at the spot where the slope is the least steep, a thin layer of gyttja overlies the eroded sand layer and contacts the culture layer with its surface.

The stratification should be interpreted in terms of an interval having elapsed between the time when minerogene material slid down the bank and the moment in time when man began to use the area for habitation. At the onset of human habitation, then, the south slope of the bank, would have been flattened out somewhat.

The consistency of the organic deposits varies in the area of investigation. Outside the bank, a layer of gyttja with varying amounts of sand mixed into it spreads along the bottom, tapering off towards the bog and ultimately disappearing, usually in places where the bottom rises again (Fig. 8). This gyttja underlies a layer steadily increasing in thickness until it completely fills the space between the bottom and the black sooty culture layer. Next to the bank the layer consists of coarse detritus gyttja which towards the centre of the lake progressively turns into drift peat. The humification converted the upper peat layer extensively and in some spots has reached down to the culture layer. This poses difficulties for a secure dating of the peat which is in direct contact with the culture layer. In addition, sand lenses have been recorded here and there. Transect fig. 10 illustrates two such sections. The lenses in question are oblong and slope outward from the former shore, one of them in contact with both the lake bed and the culture layer. The lenses were only observed over a surface of about 4 square metres.

With the exceptions given below, a culture layer coloured by charcoal and soot was documented over the whole of the investigated area. The thickness of the layer varied between only a few millimetres to approximately 40 cm. The layer was thickest in the zone around the lower part of the bank and then tapered off towards the top of the bank on the one hand and towards the bog on the other. Where the layer was thickest artefacts occurred throughout, but with a concentration in the five centimetres nearest to the floor of the layer. In two minor areas the culture layer was horizontally cut in two, divided by a thin gyttja seam. As the culture layer tapers off towards the top of the bank, it disappears rather suddenly in certain spots, while in other areas there is a transitional dark brown zone (Fig. 9). Towards the bog the thickness of the layer tapers off gradually. In the southernmost part of the site the culture layer occurs only in scattered soot-coloured spots (Fig. 8).

In content and consistency the culture layer next to the supposed shoreline is similar to the coarse detritus gyttja, and a few metres further out similar to the drift peat. The material overlying the culture layer consisted in the southernmost area of organogene products. However, proceeding towards the shoreline, it showed a successively changing composition. Not only did the minerogene element increase, but also the presence of a distinct belt was documented which, compared with the surrounding areas had high

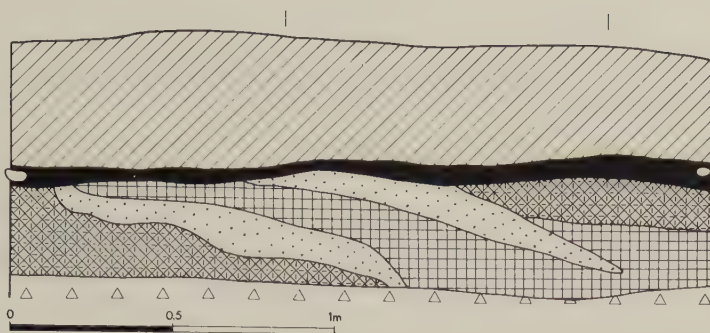


Fig. 9. Ageröd I:B. Transect with two documented oblong sand lenses.

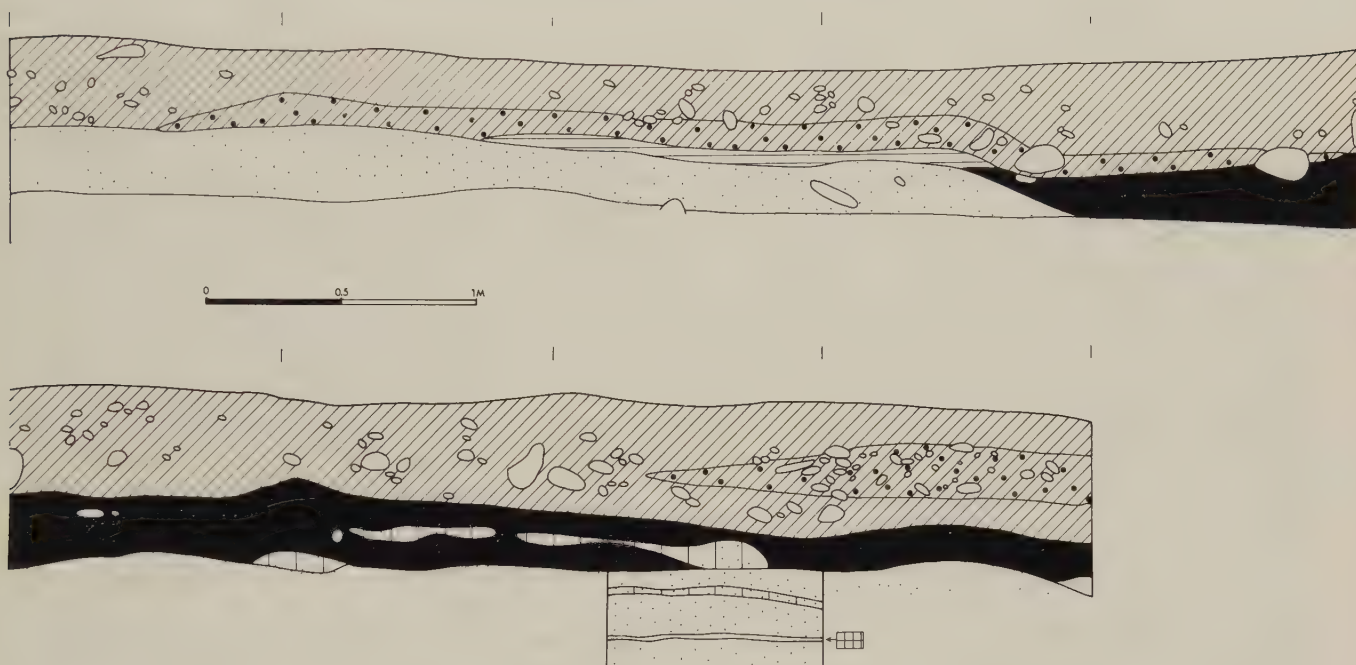


Fig. 10. Ageröd I:B. Transect through the northernmost part of the excavated area.

contents of sand, gravel and minor stones less than 3 cm in diameter. In measuring the transects, the exact limits of the belt in the horizontal plane were very difficult to explain. Samples were then taken from two transects so as to state objectively, by means of the loss of ignition method, the expanse of the belt. The belt was encountered in both transects (Fig. 6 and 8). The varying amount of organogene material can be observed most clearly in transect fig. 8, where the belt is distinctly different from both the underlying culture layer and the overlying peaty and humufied zone.

According to notations on the bags containing finds, during the excavations from 1946 to 1949 more than one find-producing layer was recorded. In order to document the division of the find-producing layers the position of every found artefact was recorded horizontally as well as vertically during the excavation season in 1971. This method is extremely useful if one wants to verify the relationship between the position of the artefacts and the observed stratigraphy, particularly within the zone of culture layer. In fig. 11 all finds within a 3.5 m long and 20 cm wide section as well as the ocularly observed layers are depicted. It can readily be seen that the artefacts tend to lie in two different strata. The lower stratum which is densest horizontally as well as vertically is located within the culture layer. The distribution in the upper horizon is more scattered but is, on the whole, connected with the gravelly belt. However, this twofold stratigraphy is only valid for the area near the base of the bank. Further up the bank towards its top, where the colouring of the culture layer disappears, the two strata turn into one.

Several alternatives for this distribution of artefacts can be considered. Closest at hand would be to



Fig. 11. Ageröd I:B. Transect of the uppermost part of the transect in fig. 8. The dots mark the position of all flint objects within a 20 cm wide section.

suppose two separate settlement periods. However, a thorough study of the gravelly belt contradicts this hypothesis. The colour tone produced by charcoal or soot which is so characteristic for the lower layer is totally lacking here. Besides, no extension of this upper layer can be observed in the organic deposits near the shore. It ends at the level of the prehistoric shoreline.

Another possibility would be that burrowing animals acted as agents in displacing some of the artefacts during a period when the gravelly belt constituted the ground surface. Such activity would be indicated by a difference in size of the artefacts in the two strata, since artefacts of smaller dimension would be more likely to be moved upward. The heavier flints, then, would be overrepresented in the culture layer in relation to the gravelly layer. However, no such tendency can be clearly distinguished. On the other hand, if we examine the distribution of bulbar flakes and flakes within a one metre wide section with high find frequency, there is a very distinct difference between the find distribution of the two horizons. The gravelly belt artefacts are mainly concentrated in the examined area next to the top of the bank, while the culture layer finds are spread over a wider zone (Fig. 12). Both this phenomenon and previous observations indicate that the upper find-producing horizon was formed by erosion. The writer's following hypothesis of this process will be further tested by means of the chronological placement of the artefact groups:

The culture layer, which originally reached much further up the bank, became exposed to progressive erosion after the settlement had been abandoned. This second erosion was considerable heavier than the preceding one and shifted larger fractions over and above the culture layer.¹⁰ A stratum of humified peat between the upper erosion stratum and the culture layer in all likelihood indicates that a certain time elapsed between the moment when the settlement was deserted and the culmination of the erosion process. For this reason the artefacts from the culture layer and the gravelly belt will be accounted for separately. The uppermost horizon will be called layer 1 and the lower horizon layer 2 or culture layer.

A small number of artefacts were also found in the layer immediately beneath the culture layer. These finds will be treated separately, since the possibility of an older settlement must be taken into account. Practically all of them are flints found in a 5 cm thick layer immediately beneath layer 2. The layer also yielded a few pieces of charcoal and bone. Two alternatives for an interpretation are feasible: the finds represent a settlement older than the one represented by layer 2, or they are the result of originally overlying material having been trodden upon and pressed down - a very plausible explanation, since the find distribution is very uneven and patchy with practically empty spaces in between find concentrations. This lower layer will be called layer 3.

Some ten pits, each 0.25 square metres large, were cut on both sides of the previously mentioned stone fence in the endeavour to find out how far the find-producing layer of Section B extended towards Section HC. It then appeared that the layers documented in Section HC decrease in thickness within a zone 2 m wide and next to the stone fence are compressed into a 40 cm thick humified layer mixed with gravel and sand. The find density decreases similarly, to amount to less than 20 flints per square metre next to the stone fence.

A parallel going in the opposite direction was then documented east of the stone fence. The essential black culture layer disappears at $x = -33$ (Fig. 5:A). After this point an artefact-producing layer continues for a couple of metres. Thus, on the evidence of the archaeological investigations, the stone fence



Fig. 12. Ageröd I:B. Distribution of bulbar flakes and flakes along a 10 m long and 1 m wide section running through the excavated area. Line of dashes marks the finds in the gravelly belt (layer 1), solid line marks the finds in the culture layer (layer 2).

can mark a theoretical as well as a physical borderline between the two sections. Similar tests were made in the eastern part of Section B. The culture layer could be followed up to $x = 25$ with an extension of a find-producing layer of another 3 metres. Thus, the finds are distributed along an approximately 60 m long section of the prehistoric shoreline.

Althin undertook test diggings on the northern side of the bank, but these gave negative results. The number of flints gathered from 5 square metres amounted to 7 only, so that the borderline of the find-producing layer may be drawn along the top of the bank.

6.2. Depositional history of the culture layer

Löfstrand, in treating the Pitted Ware settlement at Äs, states that structure and thickness of a culture layer depend on four factors. These are the settlement's nature, duration and intensity and the quality of the soil.¹¹ In the interpretation of the development of a culture layer these factors quite often overlap and thus the results of the investigation can rest on the basis of circular arguments. Only in very few cases is it possible to document any of the first three factors. They may be dealt with in the chapter evaluating the cultural history of the recorded find material. The observation that the majority of the artefacts in the culture layer of Section B were concentrated in the 10 cm at the bottom is of major importance. If the culture layer were the result of the continuous deposition of debris from human activity, the vertical distribution of the artefacts should be more extensive. The correct explanation appears rather to be that the culture layer was deposited during a habitation period of varying intensity.

An artefact-producing layer measuring a couple of decimetres can be deposited in a relatively short time. This is especially valid for the settlement soil in question, which consists of sand in the upper strata and gyttja or drift peat next to the shoreline. When people circulate intensively in a given area, the undergrowth abrades very soon. The result will be a shifting of the disturbed upper layers, whereby the artefacts become embedded, and a renewed erosion of the bank. These phenomena were taken into consideration during the excavation season in 1971. Once the undergrowth has been abraded, sedimentation can be quite considerable even after a short duration of action of its agent. As proof of this we can note an observation made in the field. After a few days' hard rain a layer measuring 5 cm was deposited in the area in which the five persons working on the excavation team moved around.

The layers have so far been evaluated in regard to colour and organic components. In order to render the records more complete, samples from two transects were taken for loss of ignition analysis. The method consists, in short, of weighing the sample which has been dried for 24 hours at 100°C. It is then exposed to 800°C for 120 minutes and weighed again. The loss of weight between the two readings equals the loss of ignition. The higher the loss of ignition, the higher the percentage of organic components in

the sample.

The samples were taken in vertical series, partly to control whether the ocular observation of the stratigraphy was correct and partly to see whether there were differentiations within a layer which has been assessed as being homogeneous. During excavating, more or less gravelly layers could be identified, but in recording the transect these were no longer observable. The readings from the loss of ignition analysis, as projected on the drawing of transects in fig. 6 and fig. 8, show that the evaluation of organic and inorganic layers was correct. The values obtained for the two layers called culture layer, i.e. layer 2 and layer 1 - humified peat - respectively, clearly show how the organic content of the layers increases progressively, the greater the distance from the top of the bank. The analysis is particularly important in evaluating the gravelly belt above the culture layer in transect fig. 8. This gravelly belt is distinctly different from the humified peat close to the surface, and this was evident along the whole length of the line where samples were taken. A sample taken at point 3 m of the line, a band present between the culture layer and the gravelly belt was analyzed too. Compared with the surrounding layers, a certain minor difference is observable here with a lower content of organic matter in the gravelly belt. The analysis does not offer any possibility for demarcating a boundary between the actual occupational area and the refuse area. In other words, it is not possible to record two adjacent samples from the culture layer, whose values would deviate considerably from values gained from analyses taken close to these two samples. One more method, namely mechanical soil-type analysis, was applied as a possibly objective stratigraphic differentiation. To this end, samples were taken from those layers which had high minerogene contents. After the material had been dispersed in water and then filtered, the fractions were grouped and weighed. There are eight fractions represented, gravel being the coarsest and clay the finest. The points where the samples were taken and the results of readings are recorded in table 1. To anyone who has dug through the various layers, the great similarity of the samples appears remarkable. There are, however, certain minor differences in percentage. For example, the percentage of coarser fractions is higher in the upper samples. This indicates that the upper part of the stratification consists of erosion horizons, from which the minor fractions have been washed out. All samples were taken from the upper layers of transect fig. 10, test point 89, i.e. near the top of the bank. In the course of the supposed erosion the coarser fractions ought to have been deposited on the upper part of the bank, while the finer fractions were washed down to the base. The low organic content also speaks in favour of this process having taken place. Layer 2, on the other hand, has approximately the same fraction composition as the underlying strata. Here, no erosion horizon similar to the upper horizon is observable. If the difference between the various layers appears quite accentuated in the course of excavation, this is probably caused by the varying percentage of organic material rather than by a varying distribution of fraction groups.

For purely experimental purposes, samples were lifted from practically every five cm within the layer sequence at test point 90 in the western part of the area investigated 1972-73 (Fig. 5:B). The aim was to determine the phosphate content. At that time, no published readings of phosphate assays from bog settlements were in existence, whereas phosphate contents of various kinds of peat had been measured but gave widely varied readings.¹² The distribution of the values within the layers is illustrated in fig. 13. The phosphate content increased from 75⁰ in the layers over- and underlying the culture layer up to 275 P⁰ in the transition area between the occupational area and the refuse area, - the phosphate content's being the same as the extent of layer 2. Thus, there is a good chance to take phosphate readings even in layers containing large amounts of organic material. Similarly positive results were obtained from phosphate assays of settlement layers in a bog at Vedbæk in Zealand.¹³

6.3. Infilling and overgrowth

In order to reconstruct the infilling and overgrowth of the prehistoric lake, pollen-analyses were undertaken once more in the area representing the culture layer and adjoining at test point 88 (Fig. 5:B).¹⁴ The main objective was to find traces of plants pertaining to the limnetic or littoral zone (Fig. 14).

In samples 1 and 2, both taken from underneath the culture layer, there are several indications of a limnetic vegetation zone, the floating-leaved plants represented by pollen and epidermis of water-lily (*Nymphaea*) and pond weed (*Potamogeton*). The corresponding fauna is represented by leaf spinules, horns of coontails (*Ceratophyllum*) and the remains of rotifers (*Cladocera*). The horsetail plants (*Equisetum*) increase rapidly from sample 1 to sample 2, indicating the beginning of overgrowing in the area where the samples were lifted, the area lying next to the belt between the high and the low water table respectively.¹⁵ A further indication is that the sediment now consists entirely of drift peat. In the third sample the traces of floating-leaved aquatic plants have disappeared almost completely giving way to high values of herbaceous vegetation (*Graminae spontanae*) and spores of fern (*Polypodiaceae*). Both are good indicators of an accelerating process of overgrowing in an ecology consisting of the supralittoral part of

Table I. Ageröd I:B. Results of soil-type analysis at test point 89.

Depth measured from ground surface Cm	Grouping by fractions Percentages of mm values								Stratigraphy
	5.6-4	4-2	2-1	1-0.5	0.5-0.25	0.25-0.125	0.125-0.074	<0.074	
20	5	11	14	16	22	22	5	5	Layer 1, part poor in finds
30	6	11	13	15	20	24	6	5	Layer 1, find-producing part
40	4	7	8	15	21	27	8	10	Layer 1, part poor in finds
50	3	6	11	15	21	27	7	10	Layer 2 (Culture layer upper part)
60	1	9	11	14	23	24	6	12	Layer 2 (Culture layer lower part)
70	4	9	15	18	19	21	5	9	Morain
80	2	6	10	15	21	27	7	12	Gyttja lens in morain
90	3	9	9	14	18	31	5	11	Morain

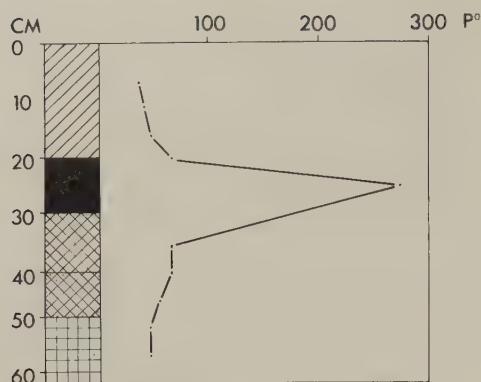


Fig. 13. Ageröd 1:B. The phosphate contents of the various layers at test point 90.

the terrestrial belt characterized by deciduous fen tree vegetation. The increasing frequency of pollen of alder and buckthorn also indicates that fen tree populations are now spreading over former shore zones.

Since the visual boundary of the refuse area was not very definite, the charcoal content of the peat was examined. A strongly pronounced maximum was documented within a layer measuring a couple of centimetres in thickness. The lower boundary line of the layer was somewhat diffuse, the upper very clearly defined.

Densely taken samples within the charcoal horizon with analyses at each 1.5 cm - samples 4-7 - indicate that the overgrowth was not a continuous and uninterrupted process but, on the contrary, fluctuated to a certain extent. The spreading of alder and buckthorn is halted. In samples 4 and 5, the diagram shows a decreasing tendency, and since there are no increasing frequencies of the limnetic or littoral indicators, this tendency could hardly mean a rising of the water table. The regressing tree and shrub vegetation gives way to increasing grass and fern populations on the beach. This change was also propitious to settlement within the shore zone. That the transformation may have been induced by human agency, e.g. scorching, cannot be excluded as entirely improbable.

In the case of samples 8 and 9 it has to be taken into consideration that an oxidation of the layers of organic matter, as well as roots penetrating downwards, may have dislodged certain strata, thus affecting any evaluation of alterations of the flora. The increase of alder and decrease of grass and fern in sample 8 indicate a densification of the alder marsh. The likely result will be a dislocation of the terrestrial belt away from the former shore and over the topogene peat. This might possibly have been the reason why the settlement was abandoned. The zone of vegetation widening from the shoreline outward into the lake and covering the open water as well as the increasing density of the alder population must have made the area less attractive. Consequently, new settlement sites nearer the open waters were sought. The uppermost sample, no. 9, indicates the terminal stage in the process of overgrowth when pine gains the upper hand over alder on the increasingly dry ground.

A factor of great importance must be introduced into this process. Nilsson pointed out certain alterations in the sediment formation, probably due to a certain degree of fluctuation of the water level of the prehistoric lake.¹⁶ The so-called natural process, namely a continuously increasing thickness of bottom sediments and a simultaneously gradual transformation of the flora due to shallower water, a process that can be documented in numerous bogs, might either have been accelerated or, as the case may be, stagnated by alterations of the water level. Nilsson thinks to have found signs indicating that the water level dropped considerably during the later part of BO 2. This may have accelerated overgrowth within Section B, radically reducing the length of the natural process in spite of a rise in the water level occurring later on.

6.4. Structures

The culture layer contains abundant stones in certain parts. That larger stones have been transported to the site is confirmed by the fact that they are underlain by culture layers. Around some of the larger stones there is a higher frequency of worked flints than in adjacent parts. Such stone slabs might have been used in flaking activities. It appears nevertheless impossible to discern any systematic positioning of these stones. Since the site was excavated in individual squares, this method excluded the possibility

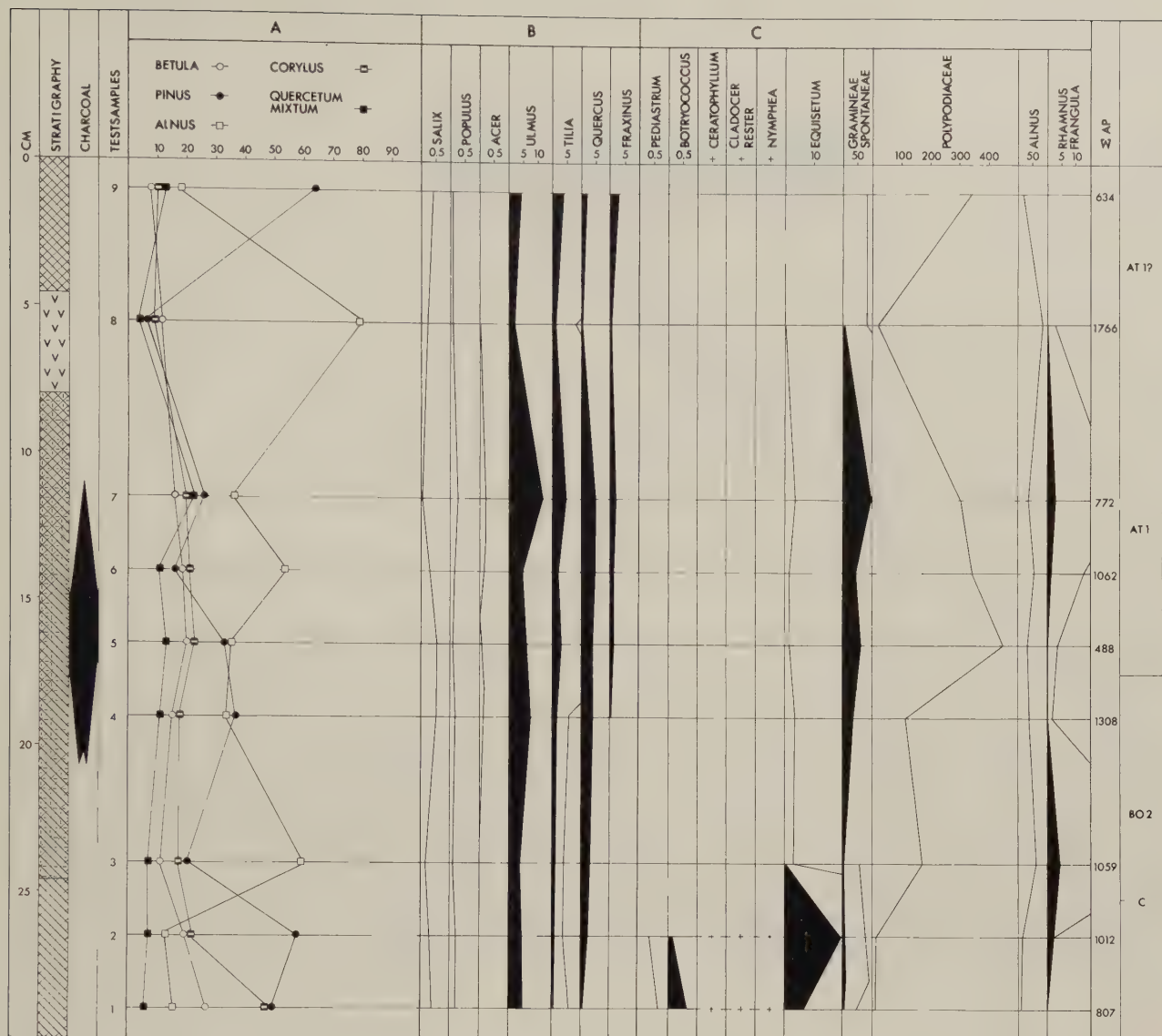


Fig. 14. Ageröd I:B. Pollen-analysis of the layers at test point 88.

of surveying larger contiguous areas of the culture layer. For this reason every stone larger than 5 cm, and its level, was recorded in the hope that structures, if they were present, could be seen in the future general view. Minor stones quite likely could have been deposited by natural agency, slipping down from the top of the bank, but the existence of larger slabs and of stones in the organogene layers outside the former shoreline cannot be explained by the same phenomenon. Certain stones appear to form short rows. But it was not possible to interpret them as a concrete construction. The weathering process had varying effects and we found both entirely unaffected and completely disintegrated stones. A very small number of stones was determined as having been rendered brittle by fire, but no marked concentration of such stones was recorded, i. a. no hearth could be documented.

In transect fig. 10 which was cut parallel to the bank, lenses of sand within the culture layer were documented. These are interpreted as traces of burrowing animals. Similar burrows, appearing as dark brown spots in the yellowish white sand and gravel below the culture layer were also noticed. To differentiate animal burrows from possible post-holes, these spots were excavated, but in none could the colouring with certainty be determined as a post-hole. Some of them were traces of tree stubs, as confirmed by the shape of the colouring and the presence of decayed wood. In one instance a light brown wood colouring could be followed upwards through the culture layer. The colouring demarcated, moreover, the boundary between a section without finds and another with a high find frequency. By following the wood colouring it could be noted that the transition between trunk and roots occurred at the transition between culture layer and sterile sand layer. The observation indicates that when man inhabited the place the tree was left standing.

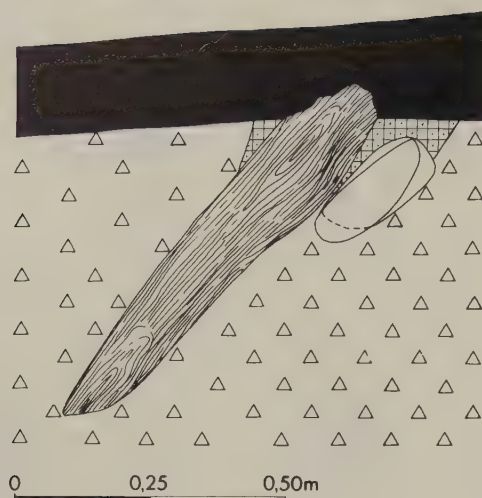


Fig. 15. Ageröd I:B. Remains of a post driven down into the ground.

There were no artefacts found in any of the excavated burrows. Within the entire area, only in one single case could it be determined that a post was driven into the ground. At $x = 5.5$, $y = 1$ wood colouring was recorded which in its lower part turned into solid wood (Fig. 15). This was a post, its preserved length 77 cm, sharply inclined towards north. No clearly determinable traces of working could be distinguished. The post originated from a 20 cm thick oak trunk, split diagonally, and ending in a point.¹⁷ The diagonal splitting was definitely not made by human agency, but on the lower part of the opposite side were traces which might have been worked by man. A number of stones in the proximity of the post can be interpreted as supports. The layers above the culture layer were not disturbed, so that the post should be considered as being contemporary with the settlement.

7. Section D

7.1. Trench D 1

At the beginning of the season in 1948 long trenches were cut in the bog running parallel to the former shoreline. The organic deposits there were thicker and less affected by oxidation, which enabled the team to distinguish traces of individual habitation layers through the study of the find position. In the compressed strata near the shore this proved impossible. Now, samples for pollen-analysis could be taken in the proximity of the settlement and also from layers that, it was hoped, would not show such extensive pollen destruction as the upper stratigraphical layers near the lakeshore. The new trenches were cut in those parts of the beach which had yielded high find intensity the previous year, i. e. Sections A, B and C.

The first trench ran parallel to the beach of Section B. The area was called Section D, the trench D 1 (Fig. 5:A). The stratigraphy of its western part was this: beneath an approximately 25 cm thick very humified layer was a "rich, tacky" layer sprinkled here and there with particles, and sometimes larger pieces, of charcoal. Underlying this was a black layer - KL - which in this particular part was separated into several sublayers. These, however, could not be distinguished while recording the finds, since the boundary lines between the various sublayer streaks were "very undulating". Stones in KL showed highly differing degrees of preservation, but no signs indicating any stone-setting. In square $y = 16-17$ an even surface of stones and large burned pieces of wood were observed in the upper part of KL. Moreover, the boundary between the rich layer and KL was sharply demarcated here. Unfortunately, the levelling tables recording the excavation of the western part of Trench D 1 during the first two weeks are lost. Up to $y = 32$, our knowledge about find distribution is therefore very scanty or completely lacking. According to the excavation journal the flints concentrated around square $y = 14$ and tapered out on both sides. In this square the rich layer is lacking for a short stretch, and the finds appear to be

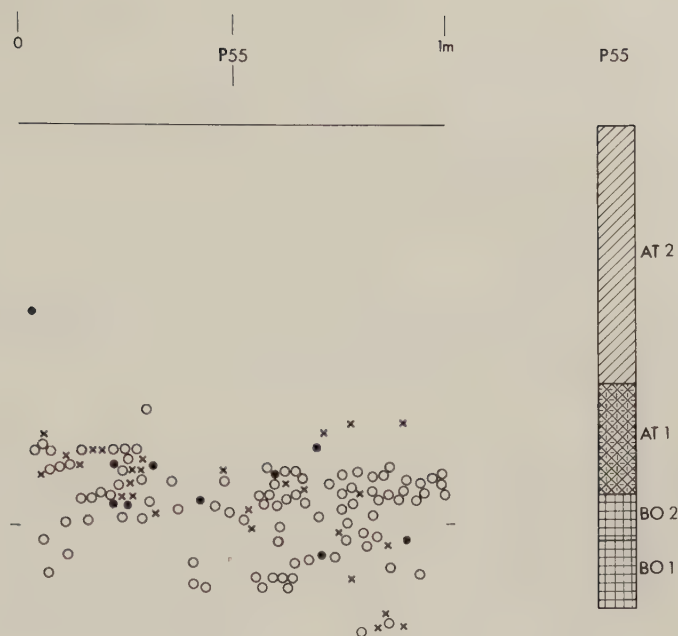


Fig. 16. Ageröd I:D. Position of flints (dots), stones (rings) and pieces of charcoal (crosses) in relation to the pollen-analysed stratigraphy.

limited to KL, mainly to its upper parts. The number of flints in this square cannot be identified, but should have exceeded that of the following, recorded square, i.e. 23. In the squares following thereafter the stratigraphy is considerably disturbed by tree-roots and lenses of coarse detritus. In squares $y = 33-36$, i.e. near the intersection of Trench D 1 and Trench B, some tree-trunks were found that were connected with a trunk found the previous year. KL partly covered these wood remains. The extension of Trench D 1 east of Trench B was led out obliquely in respect to its western part, to compensate for the distance to the shoreline. In this part of the trench an "even and calm" stratification was observed. The number of flints per square metre does not exceed three, and several squares contained no flints at all. Layer KL becomes more and more diffused as the trench is extended towards the east. At square $y = 62$ it was discontinued.

7.2. Trench D 3

Since it was doubtful whether the stratum which in Trench D 1 appeared as a single uniform artefact-producing layer really was homogeneous, an attempt was made to find KL embedded in thicker organic deposits. To this end, Trench D 2 was cut 7 m south of D 1, running parallel to it. The first stage of excavation, however, offered a picture very much like the one in D 1, and D 2 was discontinued. Instead, another trench, also parallel to D 1 but at a distance of 14 m, was cut. This trench was called D 3. This trench was also first stripped up to a width of 80 cm, and the remaining 20 cm were then precision excavated and the finds recorded. The excavation began at point $x = 14$, $y = 0$ and was extended towards the east. Two weeks later a further extension joined Trench D 3 with the previously examined Trench C 4. There is a stratigraphic description and an analyzed transect of point $x = 14$, $y = 1.5$, called P 55. In order to get a better general view, fig. 16 shows all recorded artefacts of square $x = 14-14.20$, $y = 1-2$. The transect was described as follows:¹⁸

- 0 - 62 cm Decayed peat. AT 2.
- 62 - 88 cm Drift peat, its lower part yellowish-brown, its upper part reddish-brown. Artefacts in the latter. AT 1.
- 88 - 99 cm Algae gyttja, rich in coarse detritus and elastic. Salix leaves. Sporadic pieces of charcoal. BO 2.
- 99 - 115 cm Algae gyttja, greenish grey, elastic. The lower part (approx. 5 cm) BO 1, the upper part BO 2 (level c included).
- + Morain

To begin with, some 20 cm wide benches were excavated at every five metres along the whole distance

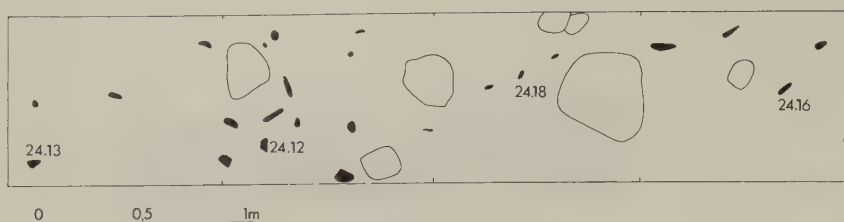


Fig. 17. Ageröd I.D. Culture layer, the part documented first. The shaded parts mark flints, the contours mark stones.

of the trench section $y = 1 - 15$. The few artefacts found here were distributed from the drift peat downward, sometimes up to a 40 cm thick band. Worked flints were found even on the lake bed itself, or immediately above it. In the western part of the trench a small number of worked flints were found, e.g. in square $x = 14$, $y = -1$ five only. As in Trench D 1, here too the number of worked flints, bits of charcoal and stones increased towards the east. This was not the case, however, in an area situated some 20 m from the original shoreline where the number of recovered finds was higher than could reasonably be expected. In the following thirty squares the number of worked flints varied, never exceeding seven per square.

The transect at square $x = 14$, $y = 15$ was described as follows:

Decayed peat. No charcoal present.

Humified peat mixed with alder leaves and roots. Pieces of charcoal.

Decayed peat. Abundant amounts of charcoal, sporadic stones. All flints found in this square were in this layer. The colour is brown, but soon oxidizes to brown-grey.

Detritus with humified peat and admixture of sand. Grey-green in hue.

Morain.

The two upper strata equal the decayed peat of the previously described transect. The humified peat and the decayed peat may possibly equal the drift peat, and the detritus with humified peat, the algae peat present at the more westerly test point.

The distribution of the levelled finds in the trench section $y = 15-30$ indicates a certain difference in the expanse of charcoal and flints respectively. The more one proceeds towards the east in studying the transect, the clearer becomes the twofold - or sometimes threefold - substratification of charcoal, while the flints, few in number, are spread out without any direct connection with the charcoal concentrations. This separation into two charcoal layers is particularly marked in square 18.

$Y = 15-16$: In the 5-10 cm immediately above the bottom the gyttja became mixed with gravel. Here, the lake bed was fairly even with only a few stones.

In squares $y = 20-25$ the bottom gyttja showed a thickness varying from 2 to 10 cm.

In the section after square $x = 14$, $y = 26$ the drift peat reached all the way down to the bottom, but was abundantly mixed with wads or lenses of gyttja. In squares $y = 27-29$ no flints were found. The number of stones and bones decreased at the same time.

In square $y = 29$ two stones, more than 30 cm in size, were documented. They lay in the drift peat mixed with gyttja approximately 20 cm above the bottom. In stripping the trench a larger stone and a 5 cm thick culture layer around it were uncovered in square $y = 35$. A transect of this layer was prepared and is shown in fig. 17. The culture layer underlay the so-called rich layer and was mixed with soot, charcoal, gravel and sand. In it, a fairly large number of stones were found, their size varying between 20 and 35 cm. In the underlying swamp peat, previously drift peat, some loose pieces of charcoal and stones of various sizes, the largest 20 cm in diameter, were found. In addition, a few worked flints were also present.

The levelled finds in transect fig. 18:A and fig. 18:B show, beginning at $y = 33$ and proceeding to the east, a contiguous layer of stones and flints. The distribution pattern of the two types of finds is in complete accordance. The upper level of this contiguous layer slopes slightly down towards the west. The abrupt boundary for recorded stones, as shown in the illustrated transect, does not exist in reality, and is only due to the fact that west of square $x = 14$, $y = 35$ no stones were recorded. However, judging by the recovered flints, the number of stones ought to have been rather limited west of the above-mentioned square. According to the excavation journal the finds were lying on thin layers of sand and gravel which probably were weathering products of stones. The culture layer was in parts badly disturbed by roots, but in certain spots, i.e. in square $x = 14$, $y = 37$ one could document up to five black sublayers, each one cm thick only, being divided by peat lenses, their thickness amounting to a maximum of 0.5 cm.

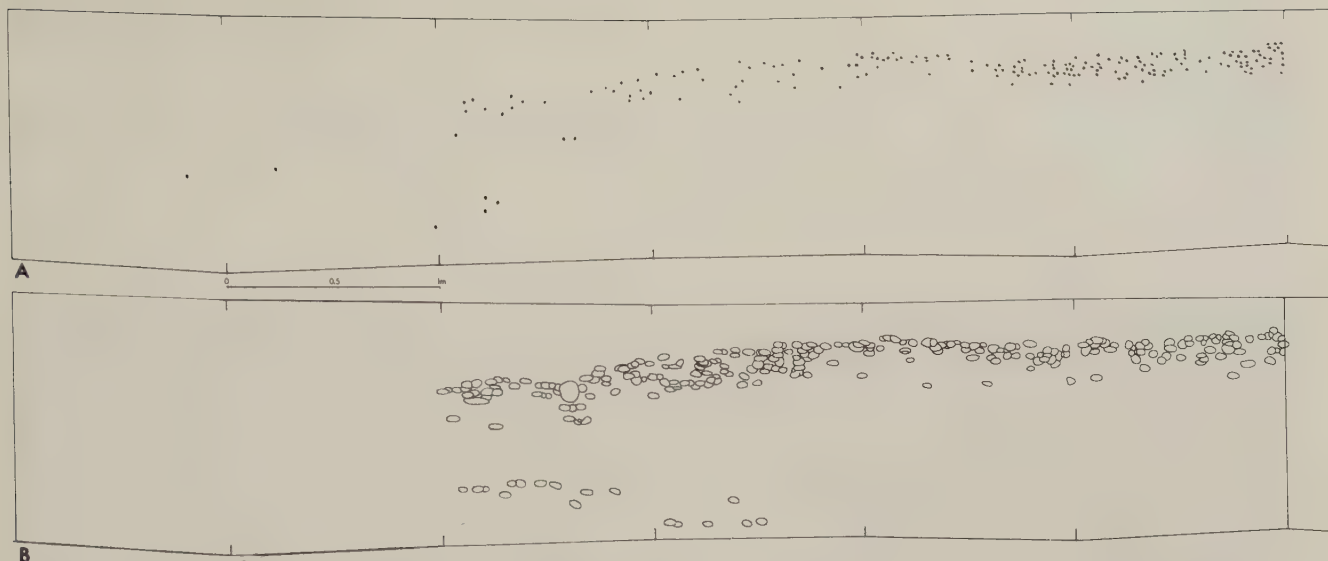


Fig. 18. Ageröd I:D. A: Distribution of flints in the area $x = 33-39$, $y = 14-14.2$. B: Distribution of stones in the same area.

This abundant yield of finds could not be associated with the settlement along the former shoreline in Section B, but represented a smaller settlement situated about 25 m from solid ground. In cutting the long Trench B the previous year, this new settlement was not recognized as such.

Trench D 3 was further extended with another 14 m east of Trench B. Two transect points of this section are described:¹⁹ P 58 $x = 14.20$, $y = 41.40$

- 0 - 30 cm Filled layer (resulting from drainage operations)
- 30 - 46 cm Highly humified peat, black. AT 1.
- 46 - 68 cm Thelypteris peat, reddish brown. BO 2.
- 68 - 117 cm Algae gyttja, lower part reddish brown, upper part olive green. The last 8 cm near the bottom sandy. BO 2, above main level c.
- + Morain.

P 59 $x = 14$, $y = 47.10$

- 0 - 58 cm Peat. No samples
- 58 - 115 cm Algae gyttja, its middle part rich in coarse detritus. Upper part rich in phragmites remains. The lowest 10 cm mixed with coarse sand. In upper part charcoal. The sample from the lower part is from early BO 1, the rest from BO 2 (level c included).
- + Morain.

In this easterly extension of Trench D 3 very few artefacts were encountered, and therefore only a few squares were excavated. These, squares $y = 47-50$, contained no worked flints and yielded moreover very few finds of charcoal and stone.

7.3. Settlement D

The excavation of Trench D 3 was completed by mid-October, after which a large area of the newly found settlement was investigated. The notations in the excavation journal are fairly detailed as far as the investigation of the area south of Trench D 3 is concerned, while the excavation north of this trench is recorded very sparingly. Important sources of information do exist, however, in the recorded transects, the plans and the pollen-analyses published by Nilsson.²⁰

7.3.1. Stratigraphy

A transect running from west to east was recorded across the settlement. Fig. 20 shows the results of the reckoning, in Nilsson's work reported in condensed form.²¹ The transect illustrates the culture layer's limited extent of approximately 4 m. Nilsson has analyzed two samples, one at $y = 34.5$ (P 56) and the other at $y = 37.5$ (P 57). They are:²² P 56



Fig. 19. View of settlement area from the north-west overlooking Section B in the foreground.

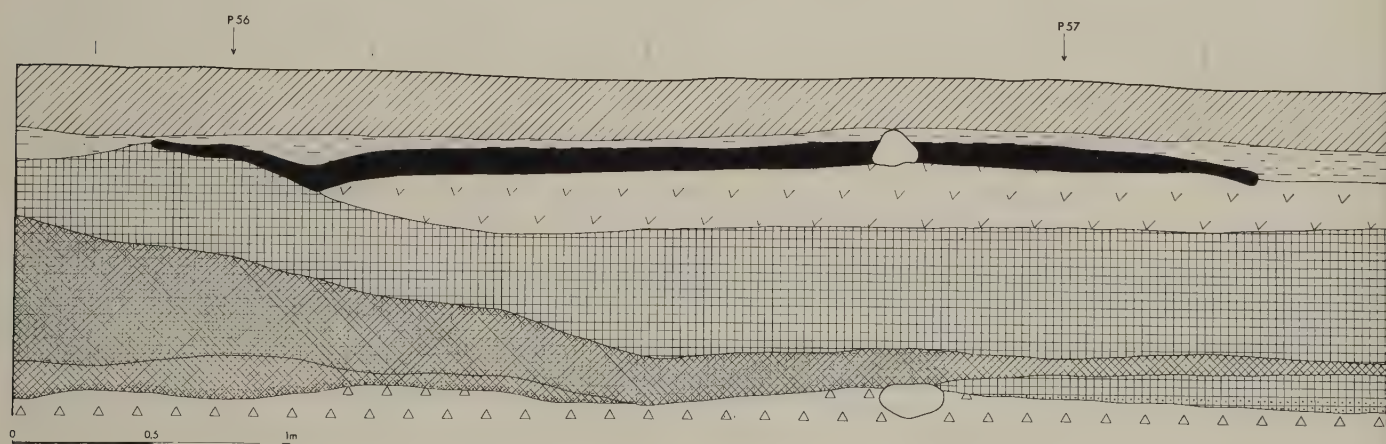


Fig. 20. Ageröd I:D. Transect through the culture layer.

- 0 - 22 cm Peat layer. No samples taken.
- 22 - 25 cm Highly humified peat, brownish grey. AT 1 or youngest part of BO 2.
- 25 - 29 cm Culture layer, black, abundant flakes, stones etc.
- 29 - 65 cm Algae gyttja with abundant phragmites. Occasional charcoal pieces. BO 2.
- 65 - 100 cm Drift peat, reddish brown, loose consistency. Sharp upper and lower boundary. Branches, charcoal pieces and wood damaged by fire. BO 2.
- 100 - 115 cm Coarse algae gyttja, greyish green, sandy in lower part. Cultural remains, i. a. a percussion stick. BO 2, (level c included).
- + Morain.

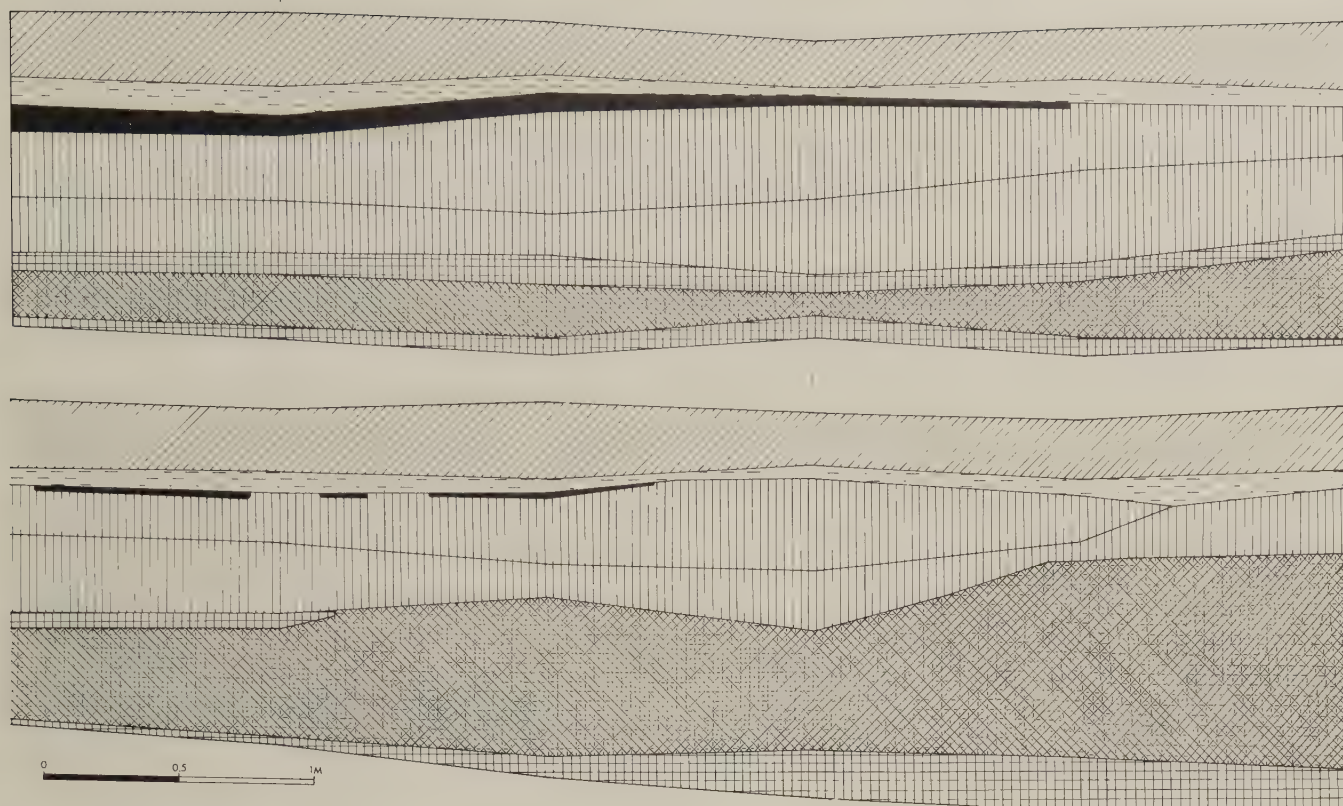


Fig. 21. Ageröd I:D. Transect through the southernmost part of the excavated area.

P 57

- 0 - 20 cm Peat layer.
- 20 - 25 cm Highly humified peat, brownish black. AT 1.
- 25 - 32 cm Culture layer, black, abundant cultural remains. Lowermost a thin layer with disintegrated stone. Appears to be AT 1.
- 32 - 51 cm Mixed oak forest peat, brownish black, abundant remains of phragmites. Transition between zones AT 1 and BO 2.
- 51 - 101 cm Algae gyttja, greenish grey. BO 2.
- 101 - 112 cm Coarse detritus gyttja, brownish grey, with occasional wood remains partly damaged by fire.
- 112 - 116 cm Sandy algae gyttja, greyish green, somewhat elastic, sharp upper boundary line. BO 2, approximately at level c.
- + Morain.

As mentioned previously, the culture layer and the overlying strata have been exposed to a high degree of oxidation. In consequence the pollen disintegrated or was exposed to selective destruction and this evidently influenced the pollen-analysis results. The test points show that the variation in thickness within the same layer can be quite extensive. This variation appears nevertheless not to influence to any great degree the dating of one and the same layer. Nilsson interprets test point P 56 in terms of the lower part of the upper algae gyttja having been torn loose, whereupon the empty space left by it was filled with drift peat. The dating of the drift peat indicates that this process has taken place during the Late Boreal period. Nilsson points out, however, that the pollen-analysis does not offer any definite proof of this.

At test point P 57 the situation is even less clear. The coarse detritus gyttja there should be a direct continuation of the secondarily deposited drift peat. During the transition between the Late Boreal and the Early Atlantic periods the overlying deposits would have consisted of highly humified peat.

At the altitude of the southernmost part of the transect given in fig. 21, but with a lateral displacement of about 3 m to the east, the following transect was recorded in 1947 at test point P 53:²³

- 0 - 45 cm Humified peat. Lower part transition BO 2/ AT 1.
- 45 - 56 cm Phragmites peat, black. BO 2.
- 56 - 104 cm Algae gyttja, greenish. BO 2.

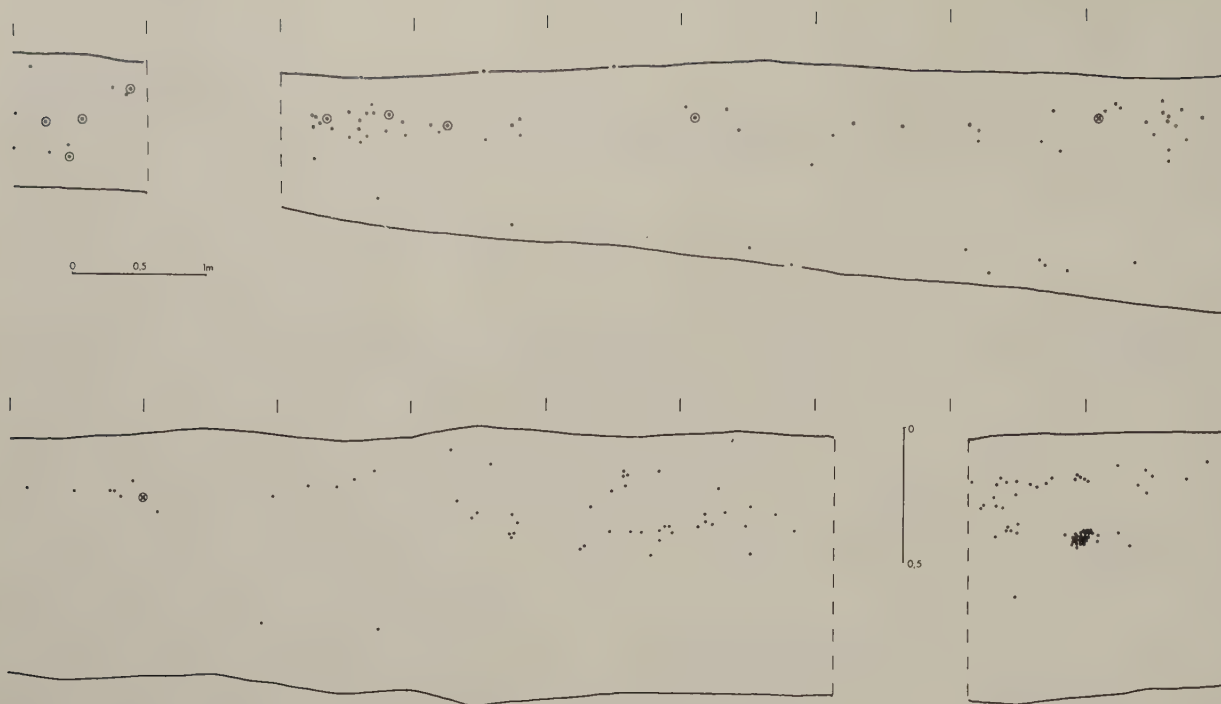


Fig. 22. Ageröd I:D. Position of flints in the 1 m wide trench extending from Trench B. Patinated flints marked by dots in circles, polished flints marked by crosses in circles.

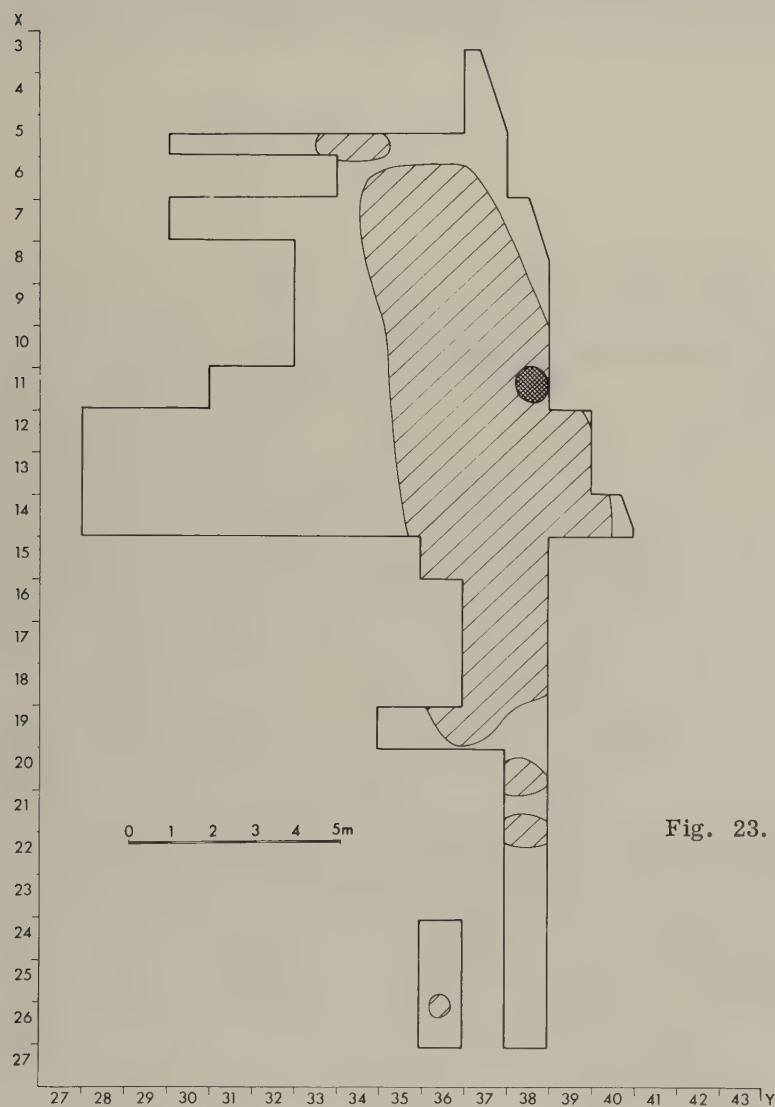


Fig. 23. Ageröd I:D. Extent of the culture layer. The cross-hatched area marks the position of a hearth.

- 104 - 140 cm Coarse algae gyttja, reddish brown. Fairly abundant microscopic charcoal fractions.
BO 2 (above level c).
- 140 - 148 cm Algae gyttja, greenish. PB,
+ Sand with stones in upper part.

In consideration of what has been said previously about the transect descriptions P 56 and P 57, the coarse algae gyttja in P 53 should be a direct continuation of the drift peat, the difference between them consisting of the amount of coarser vegetational deposits - particularly since both the coarse algae gyttja and the drift peat contained charcoal.

The demarcation of the culture layer is very sharp. Trench B ran in some places less than 20 cm from the eastern boundary of the layer, but at the time it was cut no change in the layer was noticed. The excavation of the transect bench left after stripping was discontinued at $x = 22$, i.e. only a few metres from the northern boundary of the culture layer, since artefacts were nearly totally lacking here. In 1972 a trench was again cut within a stretch of Trench B. No change in the trench wall towards Settlement D was noticeable. In contrast, by meticulously recording each artefact, a demarcated find-producing layer could be obtained on the same level as the culture layer (Fig. 22).

While the culture layer boundary in the north, the west and the east can be documented within the limits of the investigated region, its southern extension is more complicated. In excavating the area south of Trench D 3 in 1948, the team was able to follow the culture layer, appearing as a distinct layer, up to square $x = 20$, $y = 37$ (Fig. 21). As in the other parts of the excavation site, here, too, an artefact-producing layer outside the boundary line of, but on a level with the culture layer, was found. Only a few charcoal pieces occurred in the phragmites peat. On the other hand they were abundantly present in the drift peat not only outside the boundary of the culture proper, but also in that part where the drift peat was overlain by phragmites peat. In trench section $x = 24-27$ lenses of phragmites peat ranging from fist-size up to 20 x 10 square centimetres were documented. These were interpreted as parts of the settlement floor, trampled asunder and incorporated.

In the transect the culture layer was clearly distinguishable up to square $x = 20$, $y = 38$ while in the three squares south of this it appeared in patches of various sizes. In square $x = 26$, $y = 36$ a culture layer lens measuring 50 x 20 square centimetres, yielding flint, bone and charcoal, was encountered. Its thickness amounted to about 10 cm. Unfortunately there is no information about in which layer this lens was found.

The culture layer spread over a surface of over 38 square metres of the investigated area (Fig. 23). As mentioned before, its boundary was sharply marked in the west, the east and probably in the north too. In a southerly direction the layer tapered out, ultimately turning into dark patches. A partitioning of the layer is mentioned on one occasion and, according to the excavation journal, in the course of further excavation attention was paid to the question whether such separation could be observed in other parts of the investigated area. However, no such instance is mentioned later. Nor do any of the drawn up transects, cutting through the culture layer - a number of these are not treated here - show a division into sub-layers. In the area separated by line $x = 12$, $y = 36-38$ the culture layer is described as consisting of a white streak of weathered stone approximately one cm thick at its bottom. Stones not influenced by weathering occurred here too. The rest of the culture layer consisted of organic matter, coloured black by soot and charcoal.

Since the culture layer was incorporated in highly humified peat strata, finds of bone, wood and other organic matter were in some parts few in number or totally lacking. What usually remained were carbonized pieces of wood, bone and hazelnut shells. In the drift peat, especially in its western margin up to the culture layer, abundant finds of bone, wood and birch and pine bark as well as alder and birch leaves occurred, together with considerable amounts of hazelnut shells.

When Althin recorded stones and worked flints in Trench D 3, the western part of the latter showed a separation into two sublayers (Fig. 18: A+B). The lower layer of artefacts lies, according to Althin, in a drift peat stratum.

In 1972 the author undertook a minor investigation of squares $x = 13$, $y = 31-35$, on which occasion flints and stones were recorded both horizontally and vertically. There was no algae gyttja present and the finds were distributed within a layer measuring 0.50 m, incorporated in drift peat (Fig. 24). On account of the high level of the water table, the former lake bed could not be reached throughout the whole stretch of the trench. Where this was possible, an approximately 5 cm thick layer of algae gyttja or coarse detritus gyttja was observed overlying the morain.

During the digging season in 1972 the three squares $x = 16-19$ and $y = 36-37$ were also excavated. In contrast to the short trench cut north of Trench D3, the upper layers here have been exposed to intense humification. The humification process has affected the material to a depth of 50 cm, reckoned from the sod, and the stratification recorded in 1948 was unrecognizable. In the dried out part, on the other hand,

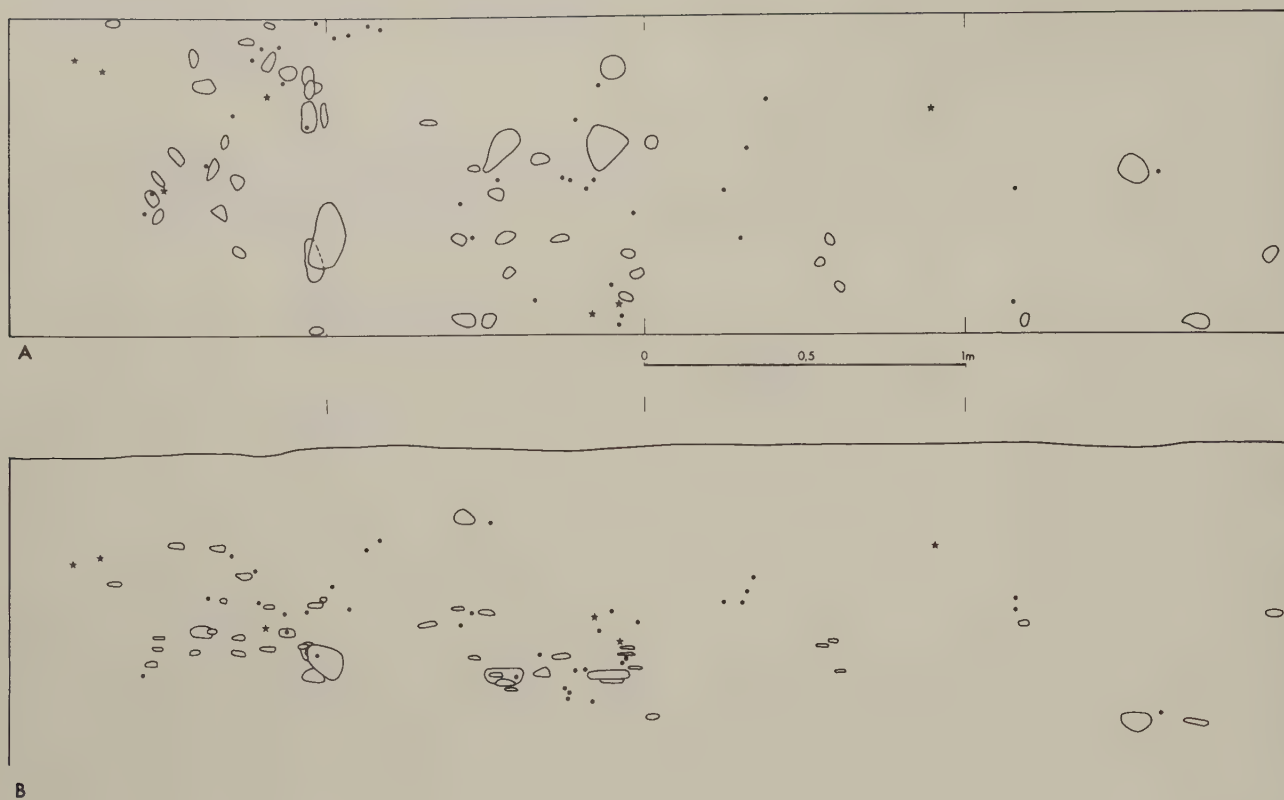


Fig. 24. Ageröd I:D. Distribution of stones (contours), flints (dots) and bones (stars) in the western part of the excavation area. A: plan and B: transect.

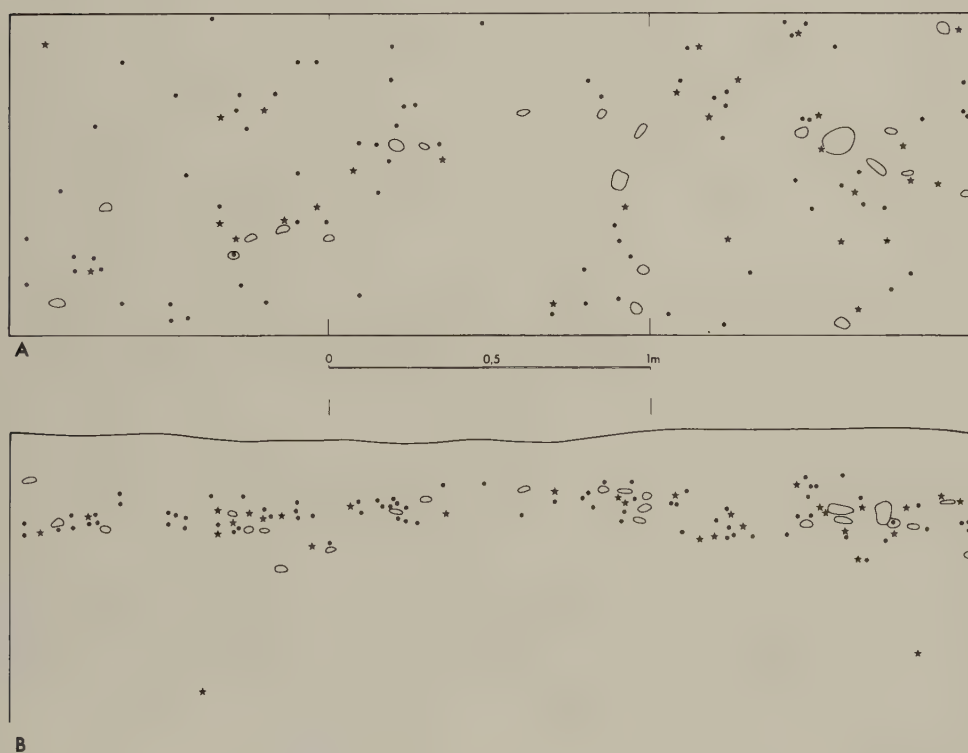


Fig. 25. Ageröd I:D. Distribution of stones, flints and bones in the southern part of the excavation area. A: plan and B: transect. Legend as in fig. 24.

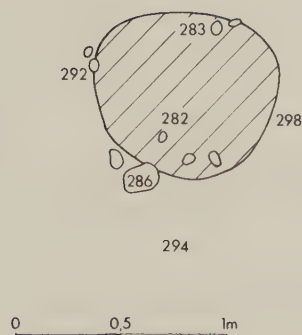


Fig. 26. Ageröd I:D. Plan of the documented hearth.

the excavation resulted in a well demarcated artefact and stone-producing layer (Fig. 25). As a sign of the culture layer, numerous patches of pulverized charcoal were recorded. Only the position of two flints deviates from the find-producing layer. Both, moreover, were located in the drift peat yielding charcoal.

Particularly interesting to note was the difference in size of the stones in those parts that were excavated in 1973. While in several cases the maximum length of the stones was more than 10 cm in the trench north of Trench D 3, in the other, southerly trench only one stone of this size occurred.

As mentioned previously, in Nilsson's opinion the drift peat in the western part of the investigated area was deposited during the Late Boreal period. Thus, the artefacts embedded in the drift peat would be older than the culture layer. However, Nilsson finds no confirmation of his hypothesis in the pollen-analytical results. It would therefore not seem unreasonable to assume that the drift phenomenon took place shortly after the settlement had been abandoned. The boundary of the artefacts should in that case indicate that the displacement of the artefact-producing layer was fairly slight. In the drift peat wedged in underneath the culture layer, only charcoal pieces, although quite abundantly in certain parts, occurred. A C 14 reading was made on charcoal taken from the drift peat rich in artefacts from a level 50 cm below ground surface. The sample gave the dating 5990 ± 80 b.c., which may be considered as a further indication that the drift phenomenon took place later than during BO 2.²⁴

An important indication in favour of the above interpretation is the fact that parts of one and the same flint blade were found in the central part of the culture layer and in the drift peat.

Judging by the documented stratigraphy and the comments in the excavation journal, the twofold division of the artefact-producing layer is probably limited primarily to the area around test point P 56. Around the rest of the settlement the find-producing layer proceeds from the soot-coloured culture layer to a horizon in the peat on the same level as that of the culture layer.

7.3.2. Constructions

Except for a few large stones that broke through the culture layer, its upper surface was very even. The uppermost peat layer was stripped by trowelling, whereafter the excavation began. In only one case was a change in the culture layer observed. Limited mainly to square $x = 11$, $y = 37$ a nearly circular small pile, consisting of ash and charcoal, was encountered (Fig. 26). Moreover the pile, approximately 90 cm in diameter, contained flints and bones damaged by fire. Along its edge a few stones were found, the largest measuring about 20 cm in diameter. This marked concentration of material damaged by fire can reasonably be assumed to be the remains of a hearth.

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14. The analyses were made by fil.kand. Mårten Aronsson who also helped the author with evaluating them.
15. Osvald 1937, pp. 173 ff.
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17. Forst. kand. Thomas Seip Bartholin identified the wood.
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19. Nilsson 1967 b, p. 33 and Fig. 19 A.
20. The author wishes to thank Professor Tage Nilsson for having given him access to a number of transect drawings from Ageröd I:D. These drawings, whose originals were later lost, had been copied by Nilsson at the time he was appointed to undertake the geological treatment.
21. Nilsson 1967 b, Fig. 16.
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24. Lu-751.

IV DESCRIPTION OF FINDS

8. Ageröd:B

8.1. Cores

Cores are defined as flints which have no bulb of percussion and show traces after at least two negatives. Cores can be classified into several types. The primary classification factor is the type of flint that has been struck from the core, the second is the shape of the core. Three main types of core have been distinguished; blade cores, micro-blade cores and flake cores with sub-divisions of each category. Cores of various types are waste products, but nevertheless contain valuable information over and above the purely typological aspects. Facts which are very valuable for the reconstruction of prehistoric society can be obtained from this group. Like several other waste products, it reflects one particular stage in the production process. The negatives of the various types of flints struck from the core enable us to study the original shape of the latter without any conscious or unconscious secondary effect. On the contrary, it may also be important what is recorded, not by the cores themselves, but rather by the finds of the surrounding layers.

The total number of cores is 695. Of these, 44 or 6% are blade cores, 142 or 21% are micro-blade cores and 509 or 73% are flake cores.

Welinder, in his study on the Early Mesolithic, deals extensively with the blade cores and especially their potential as chronological indicia.¹ He divides his material according to the relationship between the height of the core and the width of the striking platform, as well as by using the striking angle, i. e. the angle between the striking platform and the working face, into two types, A and B - not to be confused with Althin's core classification bearing the same letters.² The present paper will follow Welinder's core typology, adding certain modifications. Blade cores are defined as cores exhibiting negatives of at least two blades. The minimum number of two is established for the simple reason that it is quite possible to produce a blade accidentally, while striking flakes only. There are in fact a few examples of cores having a single blade negative. The mean value of blades traceable from the platform edge is 3.7 per core. This may be seen as a minimal value; the actual value should in effect be about twice as much. The negative blade scars on all blade cores, partly overlap, and for this reason some of the scars ultimately do not conform to the definition of blades. (See List of definitions).

Type A blade cores have a striking angle exceeding 90° and exhibit blade negatives which are traceable from the platform to the point of the core. In addition, the height of the core has to be more than double the length of the platform. Type B blade cores do not conform to all of these conditions.

Scarcely 6% of the total number of cores are blade cores. In classifying these, the number of striking platforms - 1 or 2 - has been taken into consideration too (Table II).

Table II. Ageröd I:B. Distribution in types and layers of blade cores.

Type	Layer			Σ
	1	2	3	
A 1	4	5		9
A 2		2		2
B 1	5	23	2	30
B 2		3		3
Σ	9	33	2	44

Thus, the A-cores constitute only a minor part, i. e. 25% of the total number of blade cores. Looking at closer range at the B-cores, an interesting trend is noticeable. Ten of these cores do not conform to any of the criteria set up for A-cores. Of the remaining 23 only one core conforms to the proportion criterion, while the rest have striking angles exceeding 90°. Moreover, these cores also satisfy the other criterion necessary for the A technique, namely that the negatives should be traceable from the striking platform to the point of the core. In evaluating by technique alone, whereby the core's proportions are dismissed, the following grouping is arrived at: cores struck with A technique 33 or 75%, cores struck with B technique 11 or 25%. Thus, the distinct majority of the cores were struck in the manner of the A technique, but because of intensive utilization of the rejected cores show "B" proportions. This is a typical example for how factors, quite often not brought into connection with typological considerations, can

be well worth taking into account.

In grouping the cores by the number of striking platforms, only those were counted which showed effective negatives of detached blades. Blade cores quite often show traces of extensive preparatory operation so as to make it easier to detach blades. Such preparation can be observed even on the smallest blade cores and was done by detaching flakes from the core, perpendicularly to the striking direction for blades. In the process, the scar surface became smooth and even. It is difficult to assess whether this was done repeatedly.

There are a few flakes in the flint material which have ridges transverse to the striking direction. This may very well indicate a secondary working of a blade core. It would be noticeable, if the working surface had been rejuvenated constantly. Consequently, the B-blades with ridges would represent a percentage of proportions as compared with the total number of blades. Thus, the difference between A- and B-blades cannot be an index of the capacity for producing long, narrow and thin blades, but is a proof of repeated core preparation (See Appendix II). The maximum, minimum and mean values reported in Table V for A- and B-cores respectively, show clearly that the A-cores are of the same length as type B, but considerably narrower. The B-cores also have greater variation in length as well as in width. The weight distribution diagram, fig. 27, describes the difference between blade cores and flake cores, the variation span of the former being 5-355 g, the mean value 79 g.

It is worthwhile considering to what extent blades have been removed from a core. Only 11 blade cores have negatives showing that blades have been detached from more than half the circumference, and usually only a minor part of the working face was utilized. The striking platforms are mostly oval, and the blade knapping is concentrated to sections of the long side. A few cores have negatives of a single micro-blade. The intention in these cases could hardly have been to produce micro-blades, and these items should rather be seen as the results of failure to produce blades. The length of the blade negatives varies between 2.7 and 8.5 cm with a mean of 5.0 cm, thus exceeding the mean for blades by a few millimetres (See Appendix II). In other words, the negatives on the cores are in agreement with the intact blades. Had the major part of the preserved cores been maximally utilized, they would exhibit negatives considerably shorter than the mean value for intact blades.

The handle cores is the most dominant type of the micro-blade cores - type C cores. It plays a decisive part in the chronological treatment and will therefore be discussed thoroughly.

Reventlov, in his publication about the finds from the outlet of the Rönne river, noted a type of flint which he called core with handle.³ Friis Johansen observed the special chronological position of these cores within the Early Mesolithic, and expressed the opinion that they were given an oblong shape in order to render them easier to strike.⁴ Westerby, too, noted this flint type, but had a different interpretation for its use.⁵ Basing his opinion on comparison with French Late Paleolithic material, Westerby thought that all knapping on these cores, including the ends, was meant to fashion a special type of scraper. This interpretation was based on the occurrence of edge retouches and traces of wear along the platform/working face edge. The fact that there are traces of wear on the platforms of several examples in this group of scrapers was, according to Westerby, a strong argument in favour of his interpretation. These traces of wear consist of striations in the flints' long axis, in most cases limited to one end. Westerby's interpretation was not to remain unchallenged for long. The following year, Broholm published his critique.⁶ While Westerby contended that the edge retouches were made intentionally, Broholm denied this; in his opinion they would simply be marks after spalls detached by striking the platform edge too hard. The phenomenon, he contended, appears not only on this flint type but also on other cores from both the Early and the Late Mesolithic.

Later research dealing with settlement material including this flint type introduced a compromise, separating the type into two distinct forms; the handle core, having distinct micro-blade negatives, and the keeled scraper.⁷ The shape of the latter, it was said, is the same as that of the handle core, but the distinct micro-blade negatives are lacking. No clearly defined boundary line between the two types was established, however. As in so many similar cases, the definitions were mostly based on the individual researcher's principle of selection. Previous archaeological research does not offer the premises for a more precise definition. Moreover, the type was considered to be very easily distinguishable from other core types. As for the keeled scrapers, they would be differentiated by the fact that their striking angle is narrower.⁸

Bille Henriksen deals thoroughly with the micro-blade cores in her treatment of the Svaerdborg finds and distinguishes three types; conical cores, keeled cores and handle cores.⁹ The latter two both have a working face and a clearly shaped keel. They are differentiated by the correlation between the length of the platform and the height of the core. In the case of the handle core this relation ought to be more than 1, in contrast to other micro-blade cores, where it should be less than 1. However, one cannot arrive at any unequivocal classification by reading the published diagrams.¹⁰ An interesting point is that even cores which, according to their proportions, satisfy the requirements set up for handle cores but nevertheless have no working face, should be considered a special type of handle core.



Fig. 27. Ageröd I:B. Weight distribution of flake cores type D (1), flake cores type E (2) and blade cores (3).

As the name of this type already indicates, it is of utmost importance exactly where the micro-blade working face is placed. Thus, it has to be at the end of the platform, i. e. distributed over both sides of the tangential point long axis/platform edge. The length of the working face edge must not exceed half the platform circumference. This last criterion is, however, not valid, if there are two micro-blade working faces on the same core. On such cores, the two working faces must be divided by a zone measuring at least 1 cm in width.

Handle cores are fashioned from long and oblong nodules, and it is fairly common that one of the long sides has some calcareous crust preserved. The platform is plane or slightly concave. In some instances a flake has been struck perpendicularly to the long axis in the section adjacent to the micro-blade working face at one end. By striking from the platform but also towards it, the core came to be triangular in cross-section with a clearly cut keel. In 48 cases retouch, at right angles to the platform, occurs. 24 handle cores have retouch on one side only. Discounting the cores with crust on one side, only 19 cores without retouch remain. In point of fact, then, the retouches are not, in contrast to Broholm's opinion, the inevitable results of striking. Thus, retouch is not directly connected with striking, yet nor is it a result of wear. This contention is based on the uniformity of the retouches and on the sharpness of the platform/working face edge. This edge too may present a number of small scars, but if one studies them in detail, it will be readily seen that they do not run evenly and in a row. The retouched edge is interrupted by secondary flaking. If the retouch were due to wear, this would first of all have blunted the salient parts between the percussion bulb negatives. This, however, is not the case. In contrast to the retouch on the long sides, the platform/working face edge is evened off. This, then, is a strong indication of the special striking technique used. In other words, the direct percussion technique cannot possibly have been employed here. The micro-blades have been cleft from the core either by the indirect method or, more likely, by pressure - as evidenced by a number of ethnographic parallels.¹¹ By placing a pointed implement against the platform next to its edge and applying pressure to a limited part of the edge, a micro-blade will be split from the core. Several handle cores bear traces of unsuccessful pressure flaking, showing slight depressions in the platform.¹² When pressure is applied too close to the edge, the pointed object is liable to slip off, separating spalls and blunting the edge. Such "worn" sections of the edge are to be found on a number of micro-blades. This phenomenon appears to prove that the chipping is the result of percussion technique rather than of any secondary use. If the latter were the case, the handle core would have had to be used alternately as a scraping tool and a micro-blade core - something which in the event is a very unlikely assumption.

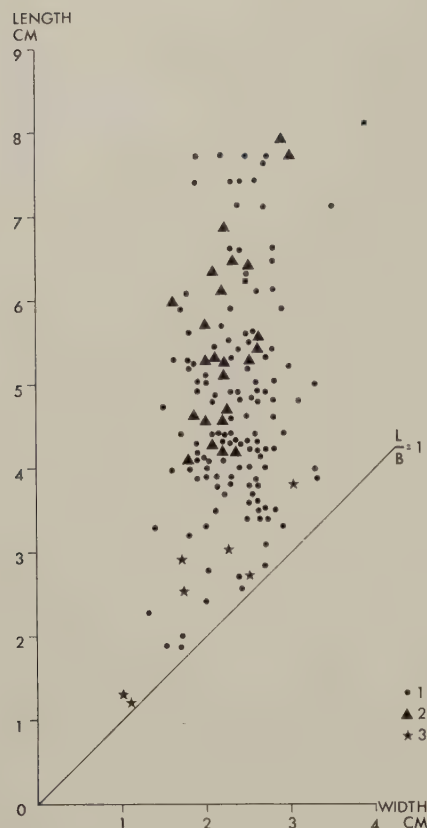


Fig. 28. Ageröd I:B. Length-width correlation of micro-blade cores. 1: handle cores, 2: "keeled scrapers" and 3: micro-blade cores of type CII and CIII.

Micro-blade cores can be divided into three groups. Handle cores, type CI, are divided into two groups: a with one working face and b with two working faces. Cores having contiguous micro-blade negatives over more than half their circumference constitute a special group, i. e. the conical micro-blade cores or type CII. Type CIII comprises the cores where less than half the circumference is provided as a micro-blade working face which, however, in contrast to the handle cores is placed parallel to the long axis.

The three types of micro-blade cores are distributed according to table III.

Table III. Ageröd I:B. Distribution in types and layers of micro-blade cores.

Type	Layer		Σ
	1	2	
CI a	20	78	98
CI b	11	21	32
CII	1	4	5
CIII	1	6	7
Σ	33	109	142

Fig. 28 illustrates that there is no explicit relationship between length and width proportions in that an increase in width would necessarily demand an equal increase in length. Although the name indicates an oblong shape, the elongation is not particularly pronounced. Merely 44% of the cores possess a length equalling at least twice their width. Since the striking angle of 29% of the individual working faces is less than 90° , flaking from handle cores cannot be referred to A- and B-techniques respectively without reservation.

Micro-blade cores of type CII, i. e. conical cores, constitute but a small group. All of them are fragmentary. Three of them have their points broken off. But in spite of their small number it can be readily seen that the recorded number of micro-blades per core is larger than for handle cores, since the entire platform circumference had been used for micro-blade production. The mean value of the micro-blades

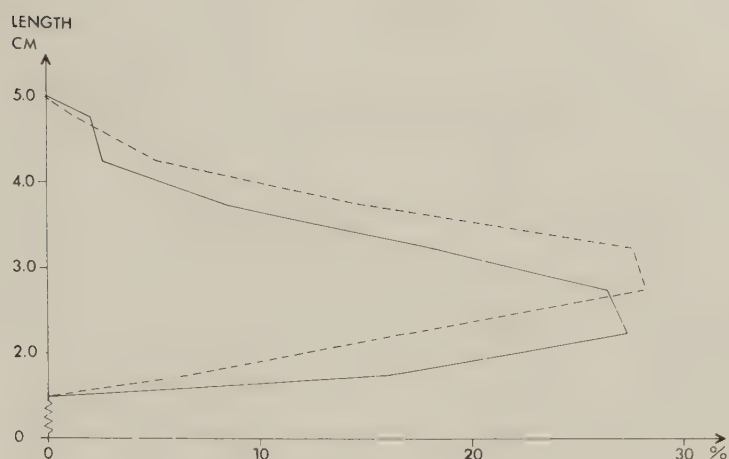


Fig. 29. Ageröd I:B. Length distribution of micro-blades (solid line) and of micro-blade negatives on cores.

is 8.3 while that of produced micro-blades per core for handle cores is 4.4.

In contrast to the blade cores, the micro-blade cores evidence a sufficiently large number of negatives in relation to the number of extant micro-blades. In an attempt to establish the number of micro-blades struck from micro-blade cores in Section B, both the micro-blade negatives on the cores and on the rejuvenation core flakes were counted. The total number was 1519. This has to be regarded as a minimal value, since only those negatives were counted which satisfied the length/width definition for micro-blades (See List of definitions). By comparing the number of micro-blades and the number of negatives it should be possible to arrive at conclusions concerning principles of selection. In measuring the negatives one has to count with a considerable insecurity factor which lies in the difficulty of having to decide in which order the micro-blades have been detached. A detached micro-blade might have deformed the negative of another, previously detached micro-blade, with the result that certain length values would be less than the original values. Fig. 29 illustrates the results of the comparison study, showing a discrepancy between length values. The maximal value of the intact micro-blades is 0.5 cm lower than that of the negatives, which would mean an under-representation of long micro-blades. It could be argued, however, that the discrepancy is explainable by the degree of fragmentation. Long micro-blades break more easily than short ones. Although this source of error cannot be disregarded, it should be of minor importance, particularly since the percentage of intact micro-blades within the maximal length-range 4.5–4.9 cm is higher than that of the corresponding negatives. Thus it is reasonable to assume that micro-blades within the 2.5–3.4 cm range were taken out of the assemblage to be used in their original state, or as material for producing implements. Primarily, their importance for the narrow microlith production has to be considered.

As mentioned previously, no clear-cut distinction between handle cores and keeled scrapers is established in the subject literature. Some researchers even deny the existence of the latter. According to Mathiasen, the keeled scraper would have been fashioned from a handle core, the difference between the two types being whether edge retouch does or does not occur.¹³

Both types of artefact were produced by flaking from, as well as towards, an oblong platform. As mentioned above, there are two types of retouch on handle cores; preparatory retouch and flaking retouch. The author has closely examined the artefacts in the assemblage classed as keeled scrapers by Althin. Some of them exhibited micro-blade negatives and thus were classed as micro-blade cores. The remaining 14 items exhibit one symmetrically tapering end, while the other end breaks off squarely. Five cores out of these 14 show long and narrow negatives of blades, shortened by secondary flaking. Thus, they do not satisfy the requirements for micro-blades, and the cores cannot be counted as micro-blade cores. In only two cases is the cut-off end provided with retouches. On the other hand, all items have retouch on one or both long sides. The material excavated during the 1970s contains 10 such items. It is thus reasonable to assume that they were originally handle cores prepared with secondary flaking but subsequently never used as micro-blade cores. Another interesting point is that they fit so well into the correlation values for the handle cores' length and width (Fig. 28).

In two cases, one of the ends which is otherwise left completely unexploited is provided with retouches. These are the only two items in the material that might have been used as scrapers. But the purpose in retouching them could just as well have been to begin a secondary flaking for a micro-blade core. After having reviewed the keeled scrapers classified by Althin as such, the writer is inclined to doubt the

existence of this particular artefact in Section B.

The flake cores are classified as platform cores, type D, and multiplatformed cores, type E. If two platforms occur, they are very seldom parallel to each other. Cores with three or more platforms are called multiplatformed.

Table IV. Ageröd I:B. Distribution in types and layers of flake cores.

	Layer			Σ
	1	2	3	
D 1	52	169	1	222
D 2	22	48		70
E	57	156	4	217
Σ	131	373	5	509

The term multiplatformed core proposed by Baudou, defines cores from which flakes have been struck at several random points.¹⁴ The definition excludes such cores where the flakes have been removed from a limited part only. There are no examples for this last category in the present material. In addition, the core should be large enough so that a flake measuring more than 5 cm could be detached from it. If Baudou's proportion criterion were applied to Section B, merely 41 items or 19% of all cores without platform would qualify. This fact well illustrates how small the average core dimensions are.

Table V. Ageröd I:B. Length and width of blade and flake cores in cm.

		Length			Width		
		Max.	Mean	Min.	Max.	Mean	Min.
Blade cores	A	7.4	5.4	2.8	3.6	2.5	1.2
"-	B	9.6	5.4	3.2	7.1	4.0	1.8
Flake cores	D	9.6	3.2	1.2	8.2	3.0	1.3
"-	E	11.5	4.2	2.2	8.2	3.1	1.3

The length of platform cores equals the distance between the platform and the opposite end of the core, its width is the maximum width of the platform. In the case of the multiplatformed cores the maximum length is measured first, and the maximum width then plotted perpendicularly to the long axis. Table V shows that the maximum, minimum and mean values of the length of the multiplatformed cores are somewhat higher than those of cores with platforms. The latter, then, have been utilized more extensively, possibly due to the fact that a core with platform can be split down to very small dimensions. However, since the shape of the cores is asymmetrical, the above measurements do not quite correctly reflect the relationship of core dimensions. Therefore, the weight of the cores was also recorded. Except for a few, the cores are the same type of flint, thus, the specific gravity would seem a negligible factor. The weight distribution of the cores is illustrated in fig. 27. Most cores of types D and E have weights ranging between 10 g and 40 g. From there up to 120 g the distribution into groups is fairly even and unbroken. Only 4 % of the cores have weights over 120 g, but they are nonetheless important when plotting the mean values of D- and E-cores, 31 g and 37 g respectively.

Except for négatives struck blades, two of the platform cores fulfill the criteria for A-cores.

The platform/working face edge on several cores exhibits small, closely placed flakings that give an impression of forming retouches. Most researchers agree that the retouches were consciously made, to even out the edge, but opinions about to what end this was done differ. Some think the retouches were intended to shape the cores into scrapers, others are of the opinion the knapper prepared the edge in order to facilitate continued knapping.¹⁵ When the edge retouch is closely studied, it becomes evident that on most of the cores it is interrupted by secondary percussions - a fact which would seem to support the latter hypothesis. In contrast, there are also examples of uninterrupted edge retouches. These are distributed as follows:

BI: 14, DI: 16, and DII: 9.

Sixteen platform cores - six of them in layer 1 - exhibit an angle between platform and working face amounting to less than 60°, but only one of these has edge retouch. This single example might be classified as a plane scraper.¹⁶ Several cores were used secondarily. Both blade and flake cores were used as hammer stones, and a few blade cores, after secondary reshaping, as core axes (Chapter 8.10.1 and Chapter 8.11).

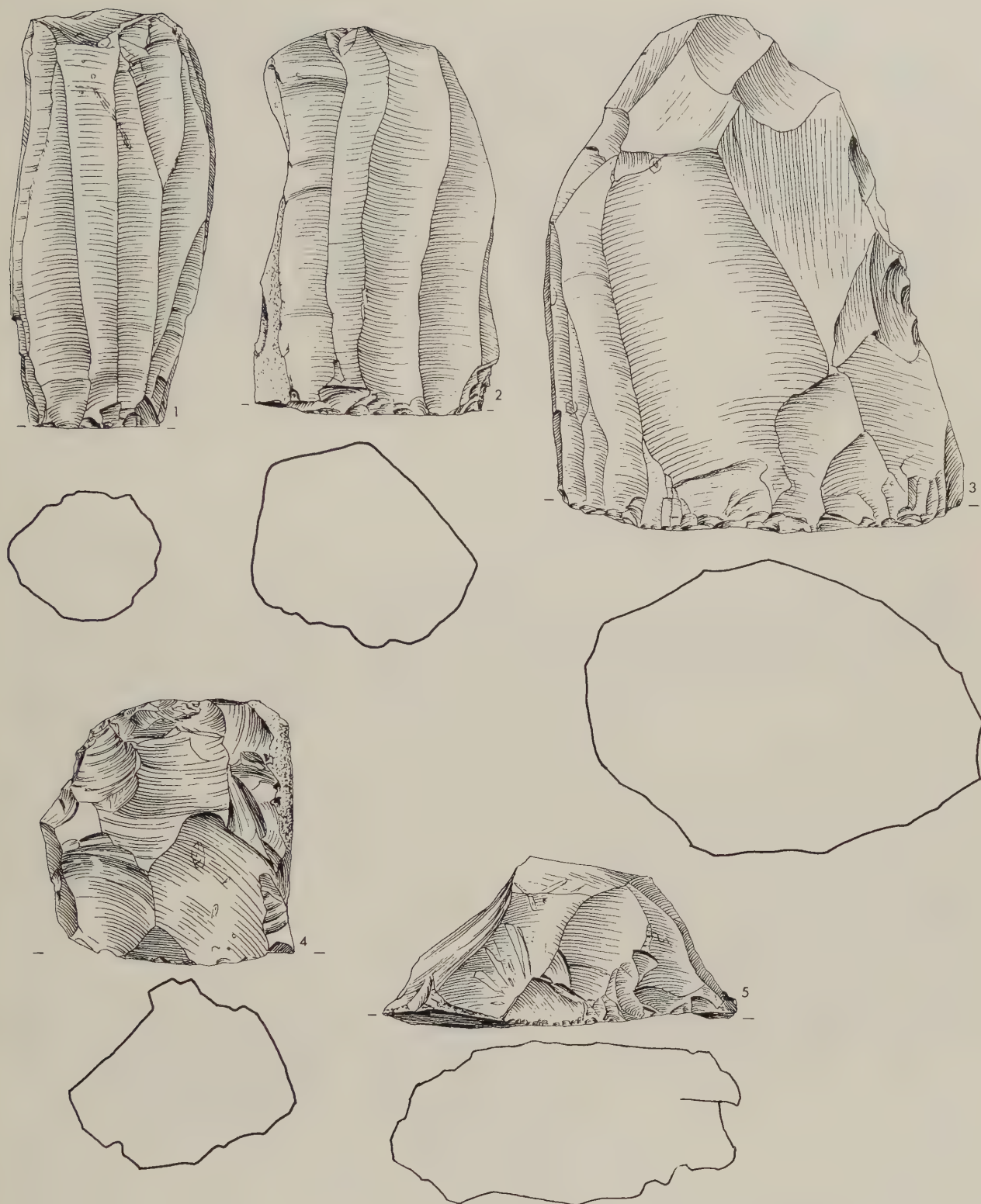


Fig. 30. Ageröd I:B. Cores. 1-3: type AI, 4-5: type DI. 1:1.



Fig. 31. Ageröd I:B. Cores (1-4), rejuvenation flakes from cores type A and B (7-8) and rejuvenation flake from handle core (9). 1-3: type CIa, 4: type E, 5-6: type CII, 7: type D and 8-9: type C. 1:1.

8.2. Rejuvenation flakes

The rejuvenation flakes from cores of types A, B and D comprise all flints, including detached parts of platforms and working faces, split from cores in order to facilitate further flaking. They are classified into the following groups:

- A: Flakes, their major part consisting of part of the platform, their minor part consisting of part of the working face.
- B: Blades having detached equal parts of both platform and working face.
- C: Flakes, their minor part consisting of part of the platform, their major part consisting of part of the working face.
- D: Flakes having detached the entire platform.

Table VI. Ageröd I:B. Distribution in types and layers of rejuvenation flakes from A-, B- and D-cores. The angle recorded is the striking angle.

Type	Layers										Σ 1+2
	1					2					
	A- or B-cores <90° >90°		D-cores <90° >90° Σ			A- or B-cores <90° >90°		D-cores <90° >90° Σ			
A	5	16	33	1	55	13	40	175	5	233	288
B	-	-	9	1	10	2	5	34	-	41	51
C	-	5	8	-	13	1	12	37	-	50	63
D	1	7	8	1	17	4	19	25	-	48	65
Σ	6	28	58	3	95	20	76	271	5	372	467

No less than 62% of the rejuvenation flakes belong to type A. Type B, representing the lowest percentage - 11% - is usually called ridged blade. This is the only type struck consistently in the same way, namely parallel to the edge. In rejuvenating the core, flaking of types A, B and D were obviously preferred. Hence, throughout the entire rejuvenating process, the cores have on the whole preserved the original proportion between height of the core and maximal width of the platform.

In addition, Table VI illustrates the result of an attempt to differentiate between flake cores and blade cores on the basis of negatives. A considerable insecurity element is inherent in this classification. At the same time account was taken of whether the striking angle was more than 90° or less. The result of the investigation shows that 20% of rejuvenation flakes detached from blade cores have a striking angle <90°. This value can very well be set in relation to those 25% of blade cores whose striking angle also is <90°. Such good accordance of data illustrates that, in spite of sources of error, classifications can be made. One finds, on the other hand, a considerable discrepancy in the distribution of rejuvenation flakes from blade cores, 28%, and flake cores, 72% respectively, when compared with respective core values - a mere 13% of blade cores and 87% flake cores. An explanation for this discrepancy would be that the rejuvenation process has been used to a much greater extent on blade cores than on flake¹ cores.

A comparison between the maximal length of the platform-part of rejuvenation flakes of type D and the platform cores was also made (Table VII).

Table VII. Ageröd I:B. Platform length of rejuvenation flakes and of cores in cm.

	Rejuvenation flakes			Cores		
	max.	mean	min.	max.	mean	min.
Blade cores	8.6	4.1	2.2	7.1	3.5	1.2
Flake cores	7.4	4.0	2.5	8.2	3.0	1.3

As was to be expected, the mean values of the rejuvenation flakes are somewhat higher than those of extant cores, since the flakes represent an earlier stage of the flaking process. One might possibly also have expected a pronounced difference in the maximal values of the two groups, considering the fact that the necessary raw material was not available in the immediate vicinity of these settlements. The cores would have been exploited more intensively. However, no such difference is apparent. Consequently, the extant cores ought to testify to the variation in size used most frequently. Expressed in a different way, it is impossible to find remains of larger cores among the rejuvenation flakes than those extant in the assemblage.

When speaking about handle cores, one must take into account the large amount of rejuvenation flakes from

micro-blade cores found on the site. Most of them were split from the core by a percussion directed against the platform. (Table VIII). Since the flakes are pronouncedly convex, quite often the entire length of micro-blade negatives is traceable. On account of their shape, the rejuvenation flakes can definitely be derived from oblong micro-blade cores flaked on one end, i.e. handle cores. 6% of the flakes have been split at right angles to the long axis of the micro-blade cores while the rest of the flakes have been split obliquely. The height of the core has been reduced in both cases. According to the number of extant rejuvenation flakes the majority of cores has undergone this sort of preparation. The maximal height of the handle cores, as plotted perpendicularly against the platform, is mostly situated next to the end used for flaking. The mean height of the rejuvenation flakes should thus exceed that of the handle cores, since the height of the latter became successively decreased in the process of preparation. When comparing heights it becomes evident that that of the flakes for the most part exceeds that of the handle cores. The mean heights are 4.2 cm and 3.7 cm respectively. On this basis, it can reasonably be assumed that the majority of handle cores underwent secondary preparation, which in turn indicates indirectly that the so-called keeled cores are nothing but rejuvenated micro-blade handle cores, for some reason not put to subsequent use. In addition to the above-described rejuvenation of the working face, there are a few examples showing partial rejuvenation of the platform.

Table VIII. Ageröd I:B. Distribution in types and layers of rejuvenation flakes from micro-blade cores.

Type	Layer			Σ
	1	2	3	
A	3	8		11
C	55	200	5	260
Σ	58	208	5	271

8.3. Microliths

Microliths are flint artefacts produced by the so-called microburin technique (See List of definitions). They are classified into two main groups, i.e. broad microliths and narrow microliths respectively. The maximal width of broad microliths is at least one centimetre, that of narrow microliths less than one centimetre. It should be understood that by "width" the maximal distance, as plotted at right angles to the long axis, the geometrical shape notwithstanding, is meant here. The classification is primarily based on the definitions for blades and micro-blades since all microliths are derived from one or the other of these two flint types. A survey of the microliths demonstrates that the variance of the primary material constitutes the boundary line between microlith types and thus also builds the basis for different typological grouping systems.

8.3.1. Narrow microliths

Narrow microliths form the largest group of artefacts in Section B, numbering no less than 1502 examples. 419 specimens, or 28% of the total, are intact, and form the material of a typological overview.

In recent years, two different typological systems were used for treating triangle microliths. Both are completely morphology-oriented, regardless of to what degree a possible retouching might have altered the microlith.¹⁷

One of these systems was used by Welinder when he studied the Early Postglacial Mesolithic. His typology is primarily based on the relationship between lengths l_1 and l_2 formed by the point of intersection of the width and the base of the triangle (Fig. 32). To differentiate triangles of so-called Svaerdborg type, absolute values of the width and l_1 are added.

Brinch Petersen's typology is based on entirely different proportional relationships. Two triangle types are defined in terms of the length relation between the two shorter sides of the triangle, a method adapted from Becker's microlith typology.¹⁸ Even this system has to make use of additional elements in the case of the Svaerdborg triangles, namely of the proportional relation between a triangle's maximal length and maximal width. The two typologies use different proportional elements hence they cannot be compared directly with each other. In the present treatment of triangles in Section B, both systems, although with certain modifications, will be used, inter alia in order to provide material for purposes of comparison.

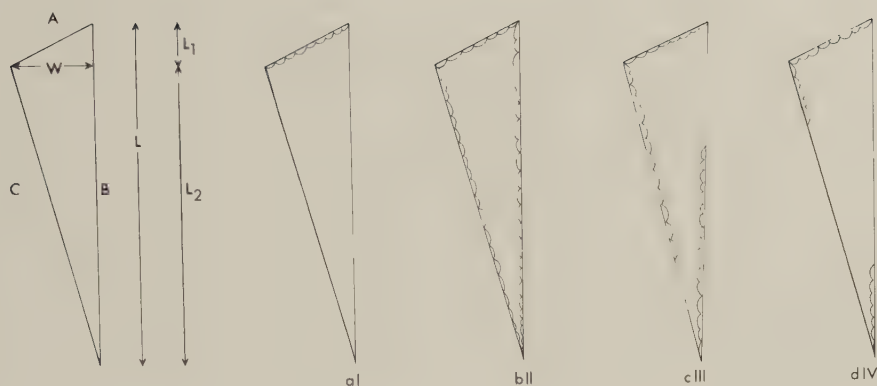


Fig. 32. Morphological elements of triangle microliths and classification of retouch position.

In contrast, typology of the lanceolate microliths is based mainly on the position and amount of the re-touching.¹⁹ Since narrow trapezes are not present in most of the published material, this particular type has very seldom become the object of typological treatment.²⁰

Brinch Petersen's typology of the triangular microliths contains the following types:

- Type 1. Isosceles triangle.
- Type 2. Scalene triangle.
- Type 3. Scalene triangle, one side being at least twice as long as the other.
- Type 4. Triangle of Svaerdborg type. One side is at least three times as long as the other. The base is at least four times as long as the width.

The author has added one more shape:

- Type 5. An extremely long and narrow triangle. One side is at least four times longer than the other, the base is at least four times longer than the width.

Welinder differentiates three main triangle microlith groups. The first one of these contains isosceles triangles like Brinch Peterson's type 1 with the addition of a certain variation in the relation of side A to side C. Any triangle lying outside this variation span is called a long triangle.

The Svaerdborg type triangles form a special group; they should have a maximal width up to 0.5 cm, and the relation between l_1 and l_2 should be less than 0.15.

None of these two typologies takes into consideration the position of the retouching that has shaped the flint. This aspect ought to be clarified when dealing with proportions.

All triangles having their side A retouched, the important factor is the extent of retouching on side B and side C. Taking the length of the retouch as in relation to the length of the side, the following classification is arrived at (Fig. 32).²¹

- a. No retouch of side B.
- b. Retouch covering the entire length of side B.
- c. Partial retouch, covering more than 50% of side B.
- d. Partial retouch, covering 50% or less of side B.
- I: No retouch of side C.
- II: Retouch covering the entire length of side C.
- III: Partial retouch covering more than 50% of side C.
- IV: Partial retouch covering 50% or less of side C.

Table IX demonstrates that the most frequently occurring triangle type in Section B exhibits retouch on side A only - aI. 46% of all triangle microliths belong to this type. Next follow the triangles with total retouch on side C - aII - 20% of the assemblage, with triangles having their side C retouched according to class III - 11% - coming third. All in all, 22% of the total are triangles with a partially retouched side C. This group also contains the only isosceles microlith from Section B. No more than 7% of all triangles have retouch on side B, while at the same time lacking retouch on side C. There are, on the other hand, eight different combinations of retouch on side B and side C, their total sum nonetheless adding up to 5% only. Thus, triangles retouched on side C amount to 48% of the material in contrast to those with side B retouched which amount to 12% only.

Brinch Petersen's definition, by accentuating the proportional relation of the triangle's length to its width, distinguishes the narrow, elongated triangles. By setting an absolute minimal value, Welinder also arrives at defining the narrow microliths. However, the relation of l_1 is not so much expressing how length and width are related to each other, but rather a means of calculating the degree to which the microlith deviates from the symmetrical shape. Although they make use of different proportional elements, both researchers arrive at the same result, namely a value specific for isosceles triangles. In the mate-

rial from the Early Maglemose Culture which they deal with, this typological element turns out to be of great chronological importance. In the present material, however, with one isolated isosceles triangle markedly deviating from the rest, it seems to be much less important, but useful in the comparison with the Danish finds (Chapter V).

That the definitions of Brinch Petersen and Welinder respectively cannot be directly translated, is best illustrated by the fact that Section B comprises, according to Brinch Petersen, 178 microliths or 54% of Svaerdborg type (4+5), while Welinder's definition allows for 132 or 40% only. A Svaerdborg microlith usually means a triangle microlith which is noticeable for its narrow and elongated shape.

The width of 20% of all triangle microliths exceeds 0.5 cm. Fig. 33:a+b illustrate the length and width values of the triangle microliths. The length varies between 0.8 cm and 3.8 cm with a mean of 2.1 cm, while the width variation is between 0.3 cm and 0.9 cm with a mean of 0.5 cm. Fig. 33:b shows that the definition for narrow microliths is based on factual grounds, the group numbers decreasing markedly in widths exceeding 0.5 cm. The distribution of the length values of the triangle microliths underscores the definition for micro-blades. Similarly to the micro-blades, the major part of the triangles has lengths between 1 cm and 3 cm. Quite likely even the longest triangle microliths are fashioned from micro-blades, although the proximal part of these, together with the percussion bulb, has been detached. The correlation diagram fig. 33:c indicates a certain separation of the triangle microliths into two groups with a boundary line at length 1.9 cm.

Table IX. Ageröd I:B. Distribution of intact triangle microliths in position of retouch, layers and morphology.

Position of retouch	Layer	Brinch Petersen's typology					Welinder's typology						Σ
		1	2	3	4	5	45-50	35-39	20-34	15-19	0-14	Svaerd-borg	
a I	1		2	5	11				5	5	8	8	18
	2		8	57	37	34		1	37	28	70	63	136
a II	1			9	4	1			4	6	4	1	14
	2	1	1	20	26	5	1		11	19	22	16	53
a III	1		1	4	1	1			3	4			7
	2		2	7	11	8		1	7	5	15	9	28
	3					1					1	1	1
a IV	1			4	3				2	3	3	2	7
	2			7	18	4			5	7	17	17	29
b I	1				2						2	2	2
	2		1	6	3				1	3	6	4	10
b II	2		1	1							2		2
b IV	2			1		1					2	1	2
c I	1			1							1		1
	2			4	2	1				2	5	3	7
c II	2			1							1		1
c III	2			3	1				1	1	2	2	4
c IV	2			1							1		1
d I	2			1		1				1	1	1	2
d II	1			1							1	1	1
	2			1							1		1
d III	2				1						1		1
d IV	2			3	1				2	1	1	1	4
Σ		1	16	137	121	57	1	2	79	84	166	132	332

In the two bar-diagrams, fig. 33:a+b special markings indicate the distribution of a I triangle microliths, in the hope of discerning possible differences of length and width between those retouched on side A only and the remaining types. For aI, retouching was only used when the percussion bulb has been detached, whereas other types were given shape by retouching one or two more sides. The mean value of aI triangle microliths, length 2.0 cm and width 0.5 cm, deviates slightly from the mean values given above. This may be taken as an indication that the retouch on side B and side C was mainly meant to correct possible deviations from a given ideal shape. If this desired shape could be reached by simply removing the bulb of percussion, there was no reason for continued trimming.

On 104 items, i.e. a good 1/3 of the triangle microliths, the micro-burin facet on side A has been left without secondary retouch. As for the trimming of side C, it is considerably more difficult to determine in how many cases it has been shortened by microburin technique or by retouching. It may be estimated that the number of recorded facets bears the same relation to the actual number as in the above calculation regarding side A.

In classifying the lanceolates, Brinch Petersen's typological system will be followed except new notations.²² Three sub-types are represented in section B (Table X).

- 6 a: Lanceolate with partial retouch on one side.
- 6 b: Lanceolate with retouch completely covering one side.
- 6 c: Lanceolate with partial retouch on two sides.

Table X. Ageröd I:B. Distribution in types and layers of lanceolates.

Type	Layer			Σ
	1	2	3	
6 a	4	17	1	22
6 b	1	4		5
6 c		3		3
Σ	5	24	1	30

The lanceolates, represented by 30 specimens, amount to a mere 7% of the intact microlith material in Section B. The group exhibits a heterogeneous picture, mainly in terms of the correlation maximal length-maximal width, as illustrated in fig. 34:a. The variation span for length as well as for width is considerable. The same holds true for the thickness of the lanceolates. In most cases, the thickness is in accordance with other microlith types, while a few lanceolates are unusually thick.

50 microliths were defined as narrow trapezes. As mentioned before, a considerable number of triangle microliths exhibit retouch on side C down to its point of intersection with side B. As a rule, the retouching does not change the triangular shape but, in the case of a few items, minor deviation can occur. In a narrow trapeze, the acute angle of side B and side D should measure more than 30°. Narrow trapezes were divided into two sub-types (Table XI):

- 7 a: Trapezes with retouch on the two short sides.
- 7 b: Trapezes with retouch on all sides except on the longest.

This classification differs from Althin's typology.²³ Microliths where only one short side exhibits retouch, while the other short side has been affected by a break without any trimming are not accepted as narrow microliths. This type of microlith is considered to be fragmentary, probably originating from triangles broken off at their narrowest, thinnest and therefore weakest part.²⁴ Similarly to the triangles, the narrow trapezes also show as well a homogeneous picture in their correlation between length and width. Their distribution is in close agreement to that of the triangle microliths (Fig. 34:b).

Table XI. Ageröd I:B. Distribution in types and layers of narrow trapezes.

Type	Layer			Σ
	1	2	3	
7 a	6	32	1	39
7 b	5	5	1	11
Σ	11	37	2	50

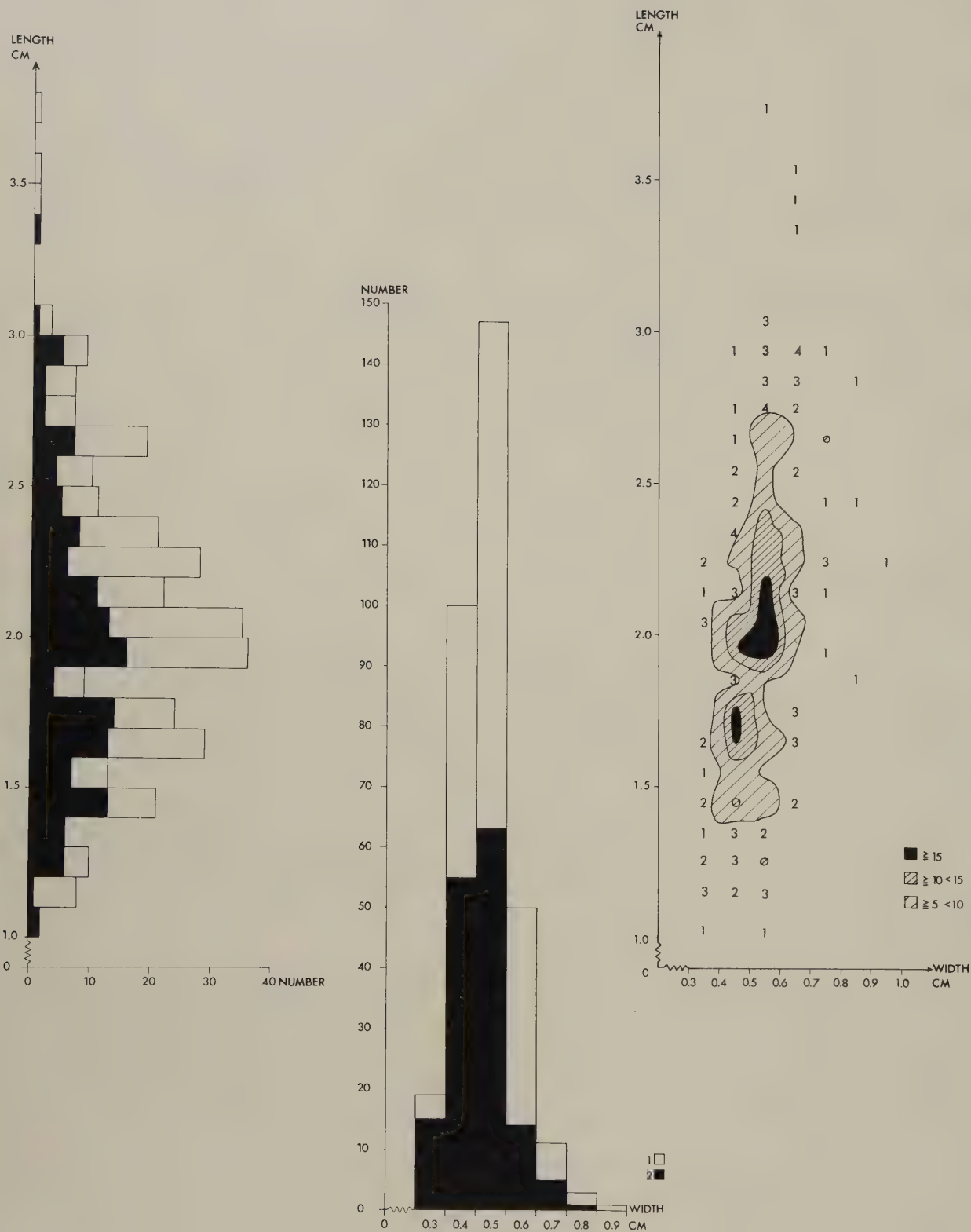


Fig. 33. Ageröd I:B. Length (A), width (B) and length-width correlation (C) of triangle microliths. 1: retouch distribution a1 and 2: other retouch distributions.

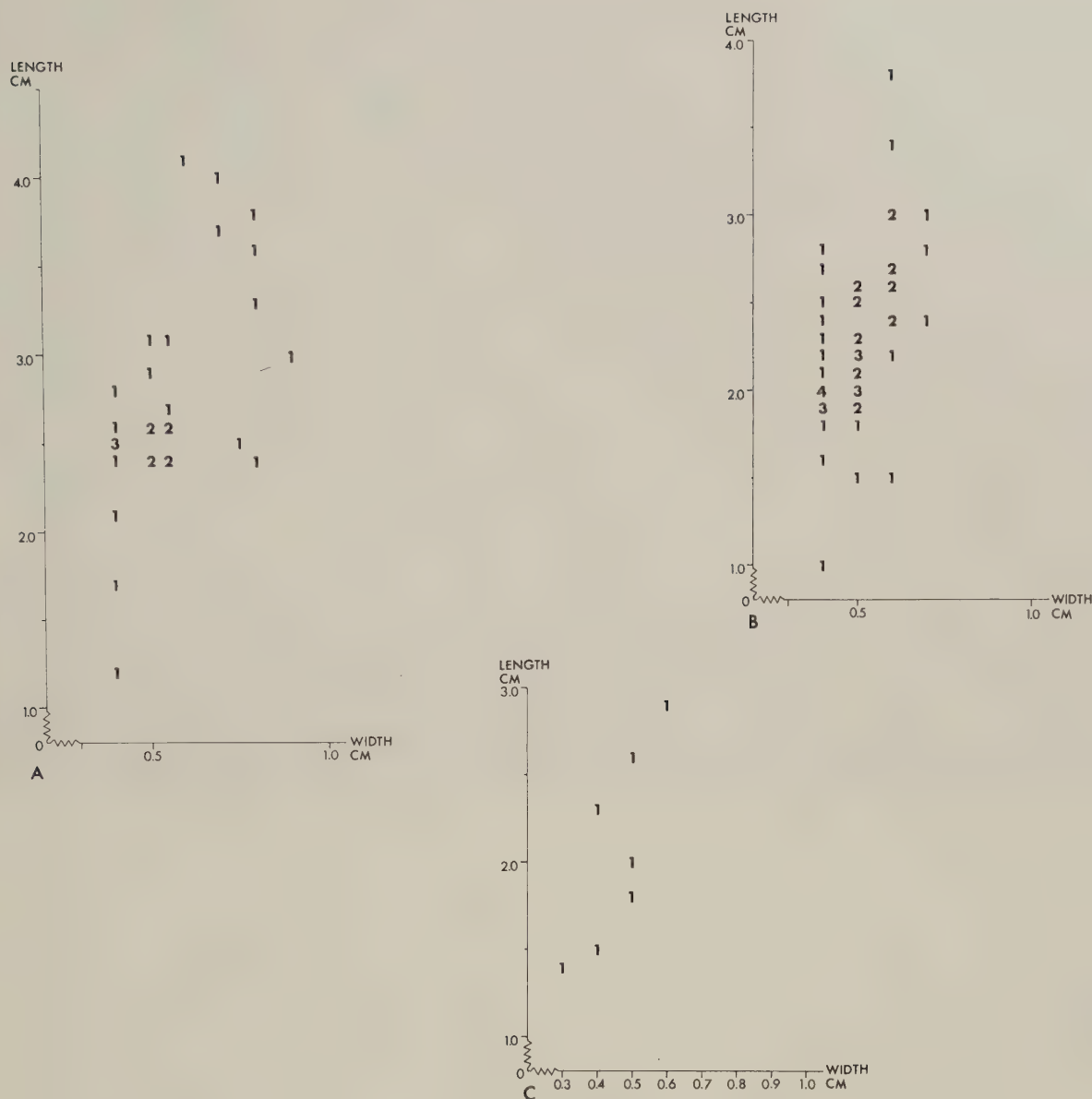


Fig. 34. Ageröd I:B. Length-width correlation of lanceolates (A), narrow trapezes (B) and segments (C).

Seven microliths were classified as segments. On six of these, the highest point of the curve lies close to the proximal or the distal end. Thus, it is very likely that they are but one variant of the triangle microliths. One single microlith shows a symmetrical curvature. All segments were encountered in layer 2. Length and width proportions are illustrated in fig. 34:c.

In the refuse of layer 2 a collection of microliths was found whose in situ position permits us to speak about a depot of narrow microliths. Within an area measuring 5 cm x 3 cm, 56 flints were excavated (Fig. 36). The depot comprised 33 microliths in all, 15 of them being intact examples. The remaining 41 flint pieces could then be reconstructed into 18 microliths, of which only 2 were fragmentary. Two of the microliths regained their original shape completely, by fitting together three fragments for each. One as yet fragmentary microlith consisted of four parts. By recording carefully the position of each flint in the depot, it became feasible to study the position of the fragments of one and the same microlith relative to each other (Fig. 37). Not in one single instance were the parts of a fragmentary microlith found lying next to each other, and more than once parts of the same microlith were stratigraphically separated by other flints. Still other complementary parts were facing up and down respectively. In conclusion it can be stated that the microliths were not demolished after their deposition. The lack of organic matter between adjacent flints excludes any stratification by roots or burrowing animals. It may be added that it is most unusual to find flints damaged after deposition in that part of the investigation area which contains artefacts incorporated in organic matter. Nonetheless, a certain systematic arrangement appears. The

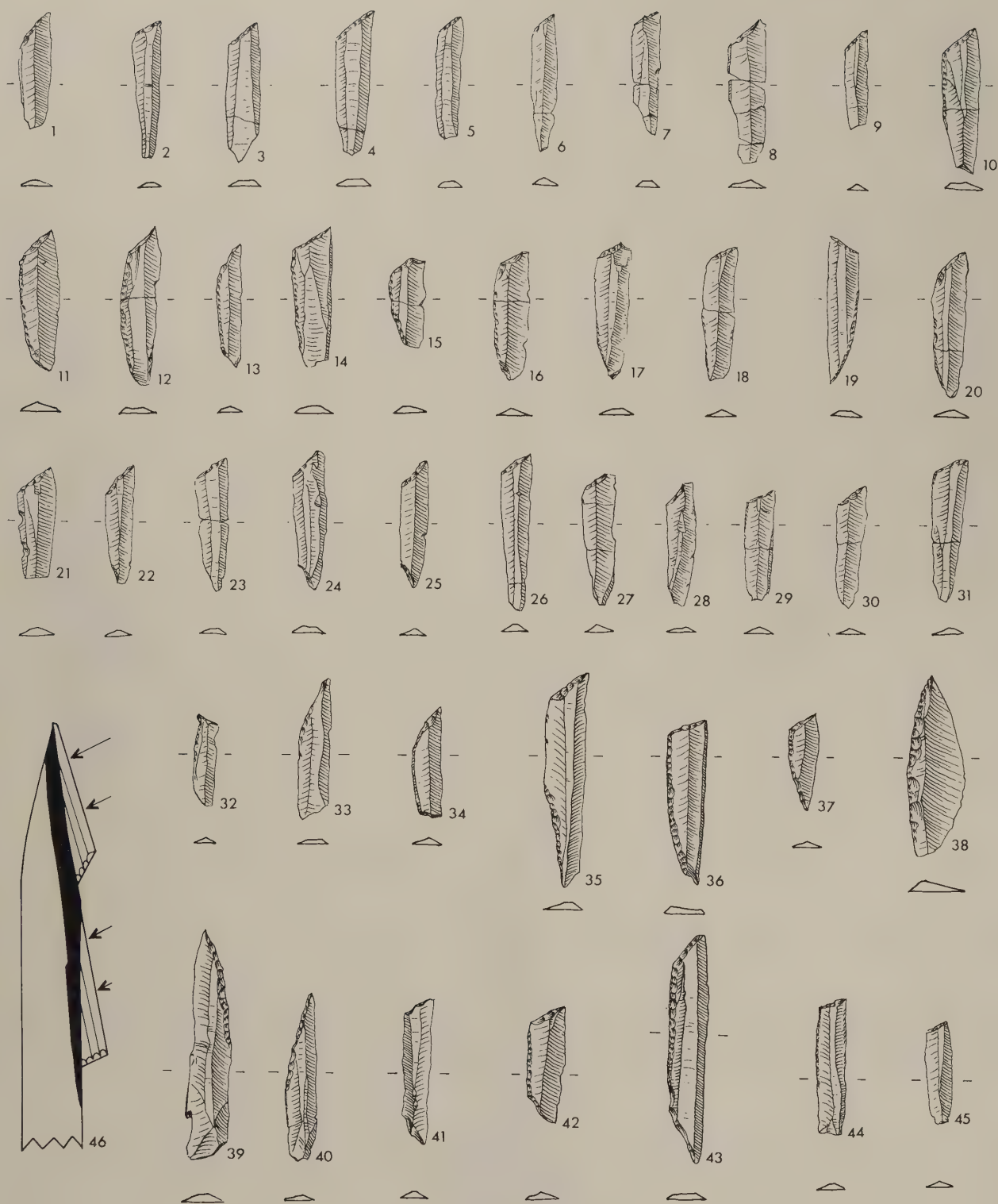


Fig. 35. Ageröd I:B. Triangles (1-32, 35-37 and 45), lanceolates (33 and 38-40) and narrow trapezes (34 and 41-44). 1-9: retouch distribution aI, 10-15, 36-37 and 45: retouch distribution aII, 16-20 and 35: retouch distribution aIII, 21-32: retouch distribution aIV, 33 and 39-40: type 6a, 38: type 6b, 41: type 7a, 34 and 42-44: type 7 b. 1-34 are the microliths found in the depot. 44-45 were found next to each other. 1:1.



Fig. 36. Ageröd I:B. Depot of narrow microliths after removal of the uppermost examples.

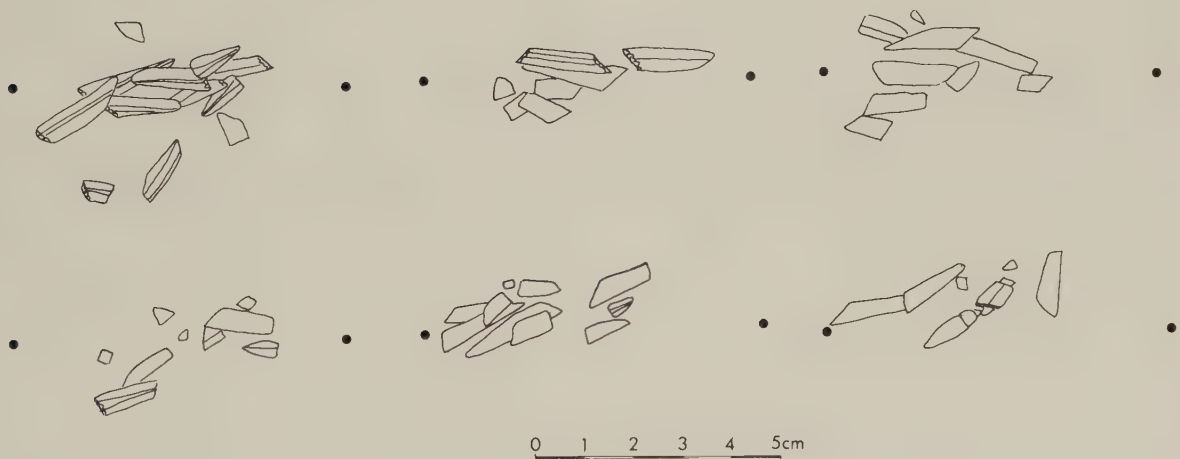


Fig. 37. Ageröd I:B. Position of narrow microliths in the depot.

majority of the microliths lie with the long axis facing the same direction, and densely packed next to and over each other. The short side A of the triangle microliths, on the other hand, is oriented in various directions. In addition, the majority of the uppermost flints face downwards with their dorsal face, while those at the bottom face upwards. The observations described here indicate that it would not appear possible to draw any far-reaching conclusions regarding the function of the microliths from this particular depot find. The microliths had obviously been broken before they were deposited. If they had been parts of composite artefacts, e.g. arrows, an explanation would have to be found why fragments of microliths measuring no more than a couple of millimetres were found concentrated in such small an area. Intentional destruction of composite implements could reasonably be expected to result in a considerably more spread out distribution. Thus it appears more likely that the microliths had been placed in a receptacle which was then thrown into the water from the shore.

This closed find of microliths offers a unique opportunity for studying the microlith stock as it has existed at one particular moment during the settlement's occupation period. The depot, containing 7% of section B's intact microliths, may yield interesting facts concerning the microlith type distribution.

Table XII. Ageröd I:B. Distribution in position of retouch and morphology of microliths from the depot.

Position of retouch	Triangles							Σ
	Brinch Petersen's typology			Welinder's typology				
	3	4	5	20- 34	15- 19	0- 14	Svaerd- borg	
a I	1	1	3	1		4	4	5
a II	3	3		1	2	3	1	6
a III	2	2	1	1		4	3	5
a IV	2	9		1	4	6	6	11
Σ	8	15	4	4	6	17	14	27

Lanceolates

Type 6a:1

Narrow trapezes

Type 7b:1

The depot contains 3 different microlith types (Fig. 35:1-34). 27 microliths or 93% are triangles. Although they are represented by very small numbers, the mere presence of lanceolates and narrow trapezes is extremely important. They constitute proof of the three microlith types having been used simultaneously. The correlation diagram, fig. 38, illustrates the size variation of all microliths whose width lies between 0.4 cm and 0.6 cm, length between 1.5 cm and 2.8 cm with a concentration at 2.0 - 2.5 cm. There is agreement between the size variation of the triangle microliths contained in the depot and the total number of those in Section B, the mean length and width respectively of the former being 2.2 cm and 0.5 cm. Thus, the length mean shows only a minor deviation from that of the mean for the total number of triangles, while the mean width is identical in both cases.

On the other hand, there is a pronounced variation between the frequency of the triangle types in the two respective groups (Table XIII).

Table XIII. Ageröd I:B. Relation in position of retouch between triangle microliths from the depot and from the rest of Section B.

Position of retouch	Depot %	Rest of Section B %
a I	18.5	56.0
a II	22.2	22.9
a III	18.5	11.7
a IV	40.7	9.4
Σ	99.9	100.0

Only in the case of a II is the difference between the two respective frequencies insignificant. The frequencies of a I and a IV differ most in that the former is underrepresented in the depot with 38% less, and the latter overrepresented by 31%. Actually it is hardly surprising that the depot find is not in all its details an exact replica of the microlith material of Section B as a whole. A closed collection of microliths may have been manufactured of micro-blades flaked from the same core and very much alike. The

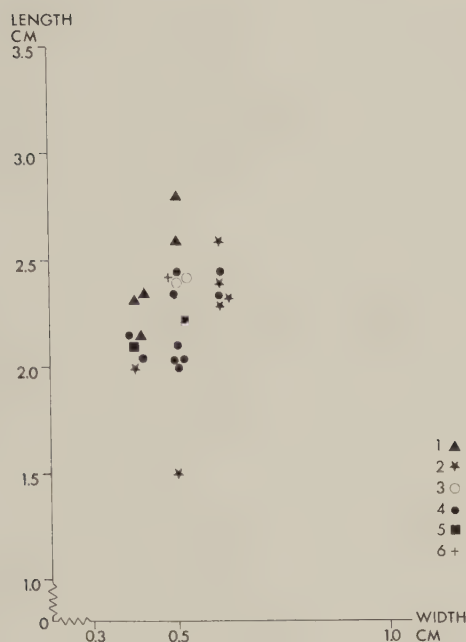


Fig. 38. Ageröd I:B. Length-width correlation of microliths from the depot. 1: a I, 2: a II, 3: aIII, 4: a IV, 5: lanceolates and 6: narrow trapezes.

final trimming will then be the same on all pieces, with an over-representation of one type of retouch as a consequence.

Only 38 items or 9% of all intact microliths are right-oriented. The percentage of the different types, on the other hand, is widely varied - 8% in the case of the triangles and up to 23% for the lanceolates. In the above-mentioned depot one single microlith has right-oriented retouch.

The above described typological treatment of the narrow microliths is based on less than 28% of the total number of microliths. Considering how little pressure is required to demolish such a flint type, the percentage may be regarded as relatively high. Each fragment was closely studied so as not to overlook any valuable information. In the course of further processing it became clear that the fragments serve well for checking the group of intensely used intact items. More than anything else, the fragmentary microliths complement the study of function, since the traces of wear quite often are more obvious on these than on the intact microliths. The position of traces of wear on the fragments support the observations made on the intact microliths. The fragmentary narrow microliths have been classified into three groups (Table XIV).

Table XIV. Ageröd I:B. Distribution in groups and layers of fragmentary narrow microliths and their relation to the intact examples.

Group	Layer			Σ	%	Intact microliths %
	1	2	3			
Triangles or trapezes	166	791	9	966	89.2	91.1
Lanceolates	5	14	-	19	1.8	7.2
Indeterminate	12	85	1	98	9.0	-
Σ	183	890	10	1083	100.0	98.3

If we compare the distribution of the intact microliths, the percentage of triangles and narrow trapezes is in agreement, the difference being only 1%. On the other hand, the difference between fragmentary and intact lanceolates is no less than 5%. One may suspect that those fragments which are classified as indeterminate were mostly lanceolates. The resemblance in percentage of the fragmentary and the intact triangles and trapezes is explained by the fact that the part of a microlith most likely to break is its narrowest point. Triangles and trapezes were damaged to a lesser degree in their upper, broad part than lanceolates, wherefore it is easier to identify them. 60 items or 6% of the fragmentary microliths classed into the group with triangles or trapezes have right-oriented retouch, again in fairly good agreement with intact microliths of the same quality.

The Loshult arrows, dated to the Early Boreal period, gave research an important tool for solving questions concerning function of narrow microliths.²⁵ The intact arrow has a triangle microlith for a point and a lanceolate for barb. From the time of deposition of the Loshult arrows up to the time when Ageröd I:B was settled, a considerable time elapsed. Nevertheless, certain parallels are observable, since the two microlith types, although in partly changed shape, were still in existence when the Ageröd artefacts were deposited. Since the above-mentioned depot can hardly give complementary information on functional aspects, special care was taken in recording meticulously the distribution and mutual relation of the microliths. To measure the latter was particularly important in the refuse area, where it was likely that one might encounter preserved parts of artefacts that had been thrown away. Two microliths found in the refuse area lying next to each other, one triangle with retouch distribution a I and a narrow trapeze of type 7 b, may be considered to have a certain value. They lay aligned and both faced upwards, the distance between them being 2 cm (Fig. 35:44-45). The configuration, which was unique in the whole of the excavation area, may indicate that they both have been fastened to a shaft, the triangle forming the point and the trapeze the barb of the arrow.

Uneven retouch occurring along minor or major sections of the edge is interpreted as frictional retouch or retouch of wear. In contrast to deliberate retouch, the flakes are split from the edge without any discernible system. In addition, the size of the negatives is asymmetrical. The retouches of wear were grouped according to the degree to which a side was worn. Retouch of wear of degree 1 is only visible under a magnifying glass. Degree 2 can be seen with the eye, and degree 3 is not only fully visible but clear enough to show the edge as a zigzag line. The division into degrees is based on a subjective assessment of the size of the retouch. The method has naturally inherent sources of error. However, it should be pointed out that the aim here is not to describe each and every microlith but to find, if possible, a system for classifying retouch of wear.

Out of the total of intact triangle microliths, 135 or more than 40% are definitely documented as having retouch of wear. In studying them, the most usual type, i.e. microliths with retouch distribution a I, was taken as a point of departure, the more so since on this particular type both side B and side C can be studied, exhibiting no deliberate retouch.

Retouch of wear was documented on 50 examples (Table XV).

Table XV. Ageröd I:B. Distribution of wear on triangle microliths (a I).

Position of wear	Degree of wear		Σ
	1	2	
The entire side C	16	21	37
Upper part of side C		5	5
Lower part of side C	1	1	2
The entire side B		2	2
Upper part of side B		2	2
Side B and side C both		2	2
Σ	17	33	50

No retouch of degree 3 occurred among the examined microliths. The upper and lower part respectively of sides B and C are described as such in relation to side A. The table shows that side B is affected to a considerably lesser degree than side C. Only 12% of the triangles have retouch on side B. When retouch does occur on a minor part of this side, it is for the most found on the upper half. Of the other triangles, 59 microliths exhibit retouch of wear of degree 2 on their side C.

Thus, the study shows that even though triangle microliths might have had differentiated uses, side B, regardless of the function, was usually protected from outside influences. It is then reasonable to assume that they, just like the Loshult microliths, served as arrowheads. If this was the case they may have been, as indicated by the position of the retouch of wear, fastened in the manner illustrated in fig. 35. The retouch could hardly have been brought about by the arrow hitting its mark. The fleshy part of an animal

would not affect a flint edge, and contact with bone would have caused much more serious damage. The retouch may have been caused by handling the arrows in the quiver or, in the case of a miss, by the arrow penetrating the ground.

Eight lanceolates of type 6 a show retouch of wear of degree 2. In one case only was the retouch on the left side of the microlith. Retouch of wear is found on 25 narrow trapezes of type 7 a. Of these, only two have retouch oriented towards the shorter of the two long sides in combination with retouch of wear on the opposite side.

When studying retouch of wear, the most frequently occurring source of error is some secondary effect caused by something after the flint was deposited. The edge may quite often be effected by pressure or concussion with other artefacts or by human activity which took place in the settlement. Subsequent stratigraphic shifts may also leave their traces. In contrast, traces caused by excavation are easily distinguished. Most of the flints are patinated, so that retouch caused by, for instance, a trowel is considerably lighter in colour. All other, older secondary flaking is difficult to distinguish from retouch of wear. It only stands to reason that all parts of a flint would be affected secondarily.²⁶ But if one or several common traits could be found by a systematical comparison, these secondary affects should be of minor significance.

Another, third type of retouch is also found on microliths. In contrast to the two former kinds, this retouch is decidedly finer, i.e., the flaking negatives are shorter. Their length does not exceed 1 mm. Like the deliberate retouch, this finer retouch type, called micro-retouch, is quite even and shows only minor differences between the negatives. The pressure causing this kind of retouch is oriented in one direction. It is not unusual, however, to find one edge provided with a so-called propeller-retouch, which starts out in one direction but then continues with retouch struck from the opposite direction. In spite of the resemblance to the deliberate retouch, there is an essential difference between the two in that micro-retouch is not applied in order to change the original contour of the flint. The retouch follows the original edge for a shorter or longer distance, but very seldom for the whole length of one side. Moreover, in those cases where it reaches its maximum, the striking angle is somewhat more acute than the angle of the unworked part of the edge. Deliberate retouch, on the other hand, breaks sharply.

Triangles with retouch distribution a I was selected from among the triangle microliths for the study of micro-retouch. Micro-retouch was recorded on 62 examples. Of these, 41 had side B, and 21, side C retouched. This result may be seen in relation to the distribution of retouch of wear markedly concentrated on side C. In other words, the proportional distribution of micro-retouch and that of retouch of wear is the opposite. The former is located on that part of the triangle microlith which was least exposed to external influence. This suggests that the micro-retouch was applied so as to give the flint a more adherent surface to a binding material, e.g. resin.

8.3.2. Broad microliths

So far, very few serious attempts have been made to define the three types of transverse, oblique and broad trapeze arrowheads. If we want to regard the study of one of these forms as complete, we must first formulate exact definitions of the other two types, in order to eliminate the slightest misunderstanding. The lack of accurate definitions is mainly due to the fact that by far the greatest part of the three types is very easy to distinguish from one another with relatively simple comparative methods. As with so many other flint forms, the difficulty lies in identifying those forms that differ from the general types.

References to illustrations have often been used as a basis of evaluation of variants. Quite frequently, one finds attempts to class the transverse arrowheads into several sub-groups without stating the threshold value of the type.²⁷ If there exists a gradual development linking certain forms, as claimed by some researchers, a seriation based on defined types ought to give an illustration of that development.²⁸ For a seriation based on the three main types alone is too schematic. Thus, serious objections may be raised to the frequently stated point of view that the chronological homogeneity of a settlement should be evaluated according to which of the three main types is represented in it. Reasoning along these lines would, in the extreme, negate any connection between the various forms.

Thus, in accordance with what has been said above, and prior to dealing with the broad microliths of Section B, the definitions must be stated. These rest on the basic concept that the three forms are to be regarded as variants of the same geometrical shape, namely the trapeze. Several attempts to group the variants on the grounds of a few measurement values were unsuccessful because of the vast number of documented variants. Therefore, a method was chosen which brings several measurements into relation to each other.²⁹

The following measurements were taken (Fig. 39):

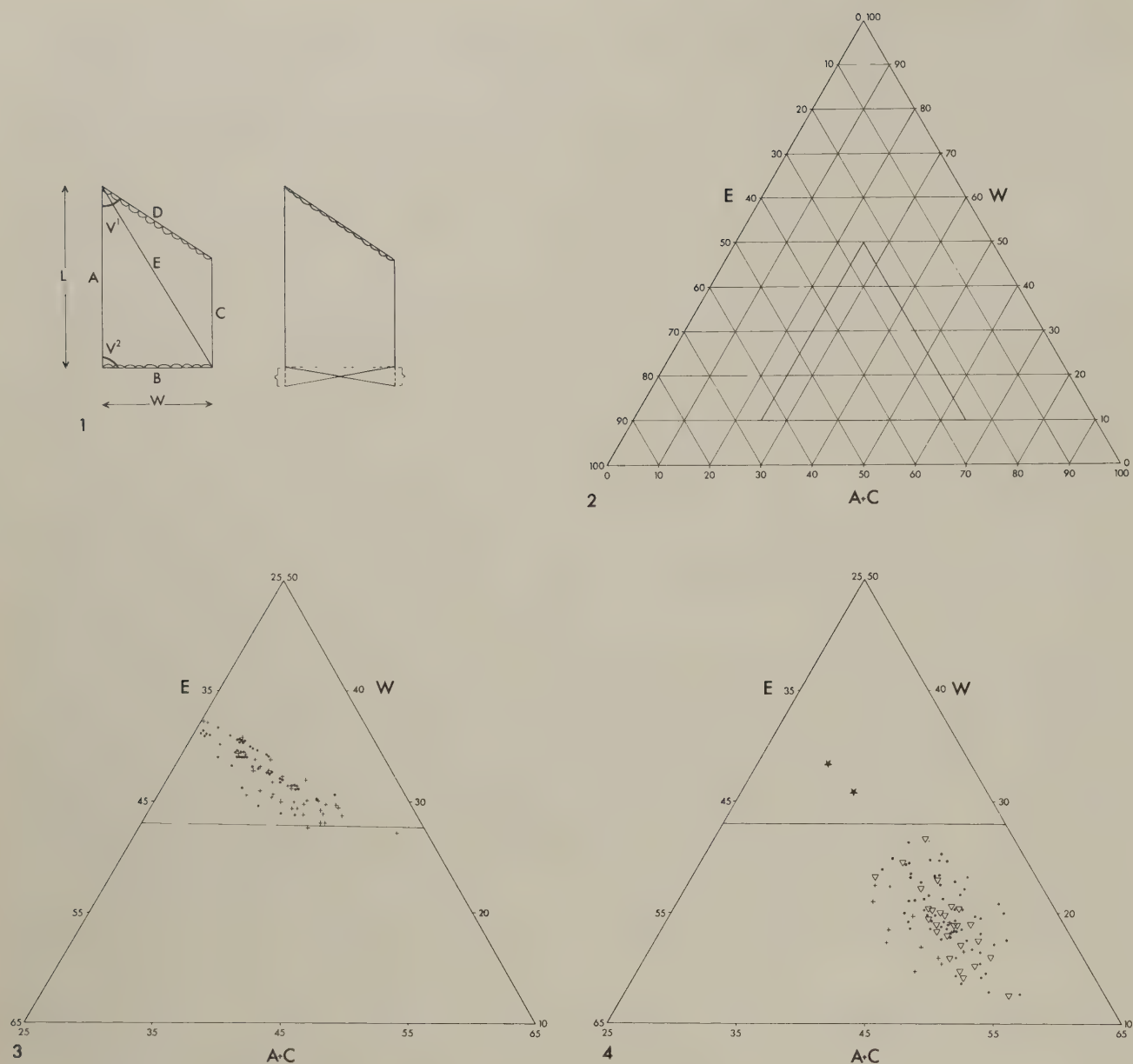


Fig. 39. Triangular diagram (1) showing the mutual relation of the values of trapezes (2) and with special marking of the area of the plotted values. To the lower left diagram (3) showing the values of trapezes from Elinelund (dots) and Kämpinge (crosses). To the lower right diagram (4) showing the values of trapezes from Ageröd I:B with trapezes types 1-4 (dots), type 5 (crosses), semi-manufactures (triangles) and transverse arrowheads (stars).

- 1: Length of the two sides without retouch. The two values are added - $A+C$.
- 2: Greatest distance between two opposite corners - E .
- 3: Greatest distance between the two sides without retouch - W .

The mutual relation of these values is illustrated in a triangular diagram, whereby a division into two distinct groups of all trapezes is achieved. Those trapezes where the maximum distance between the two unretouched sides - W - exceeds 28% of $A+C+E+W$ are called transverse arrowheads (Fig. 39). In the case of so-called transverse arrowhead settlements such as Kämpinge or Elinelund, 95% and 100% respectively of the trapezes fall within this definition (Fig. 39).³⁰ The group, which contains a number of variants, is thus separated from the rest of the trapezes. In contrast, the method cannot provide any unambiguous division between oblique arrowheads and broad trapezes. These forms have to be separated by means of other characteristics.

Materials containing both broad trapezes and oblique arrowheads have so far not been dealt with thoroughly - with the exception of those from the settlements on Jutland.³¹ In the opinion of the author the classification of trapezes applied there is not suited to the present material, owing to certain

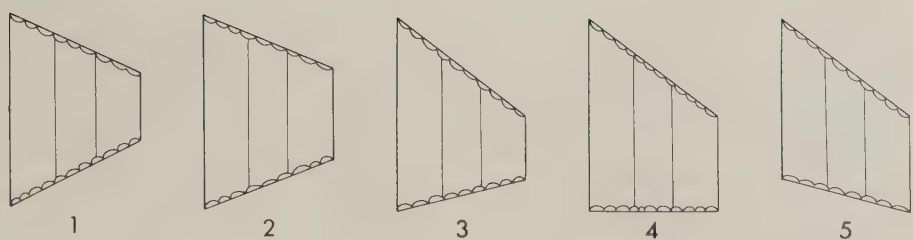


Fig. 40. Five types of broad microliths.

morphological differences.

French research has traditionally paid special attention to typology, particularly in regard to the Paleolithic.³² The results have served as a guide for research in scientific communities all over the world. In recent years several attempts have been made to introduce a generally valid typological system for the Mesolithic as well.³³ Because of often insufficient coordination between the various typological systems, the most prominent researchers in the field formed a group in order to work on the problem: "le Groupe d'Etude de l'Epipaléolithique-Mésolithique", in abbreviated form G.E.E.M. The group published a number of typological templates dealing with a limited number of artefacts, among them the trapezes.³⁴ This trapeze typology, with certain modifications, is used here (Fig. 40).

- Type 1. Trapeze, the two retouched sides B and D facing each other symmetrically. The length of the shortest unretouched side C should not exceed half the length of the unretouched side A.
- Type 2. Trapeze, the two retouched sides B and D facing each other symmetrically. C is at least as long as one half of A but shorter than the distance between the two unretouched sides (W).
- Type 3. Trapeze, the two retouched sides B and D facing each other asymmetrically. A triangle formed by side B, the maximum distance between the retouched sides (W) and a section of side A, its shortest side exceeds 1/6 of W (Fig. 39).
- Type 4. Trapeze, the two retouched sides facing each other asymmetrically. If a triangle is formed as above, the shortest side is shorter than 1/6 of W.
- Type 5. Trapeze, the two retouched sides facing each other asymmetrically. If a triangle is projected towards side C, the shortest side exceeds 1/6 of W.

Type 1-3 were previously not separated in Scandinavian material. Type 4 corresponds to Althin's concept of broad trapeze, and type 5 to his oblique arrowhead.³⁵

Table XVI. Ageröd I:B. Distribution in types and layers of broad trapezes.

Type	Layer			Σ
	1	2	3	
1	1	2		3
2		2		2
3		2		2
4	14	44	1	59
5	3	12		15
Σ	18	62	1	81

Type 4 is the dominant form (Table XVI). The symmetrical trapezes, amounting to a mere 6%, play a very insignificant role. Since the type 3 trapezes are so few in number, they should hardly be considered as an independent type but rather as a variant of type 4, particularly since the value of obliqueness in both cases lies close to the minimum value of 1/6 of W. To apply a similar argumentation in the case of type 5 is more difficult, mainly because this type includes the second highest number of trapezes.

The correlation diagram fig. 42:c illustrates the distances L and W of the various trapeze types. For all types, the value of L is higher than that of W. Out of the 74 measurable trapezes only 7 exhibit a length exceeding twice the width. The values for L and W are also illustrated in the staple diagram of fig. 42:a and fig. 42:b. The value of 1 cm for W, although a sharp break, is a well-founded minimum value for the broad trapeze microliths. The distribution of the L values, on the other hand, is in better agreement with a normal distribution. The various trapeze types show good agreement in regard to L and W, as can be seen from these calculations of mean values (Table XVII).

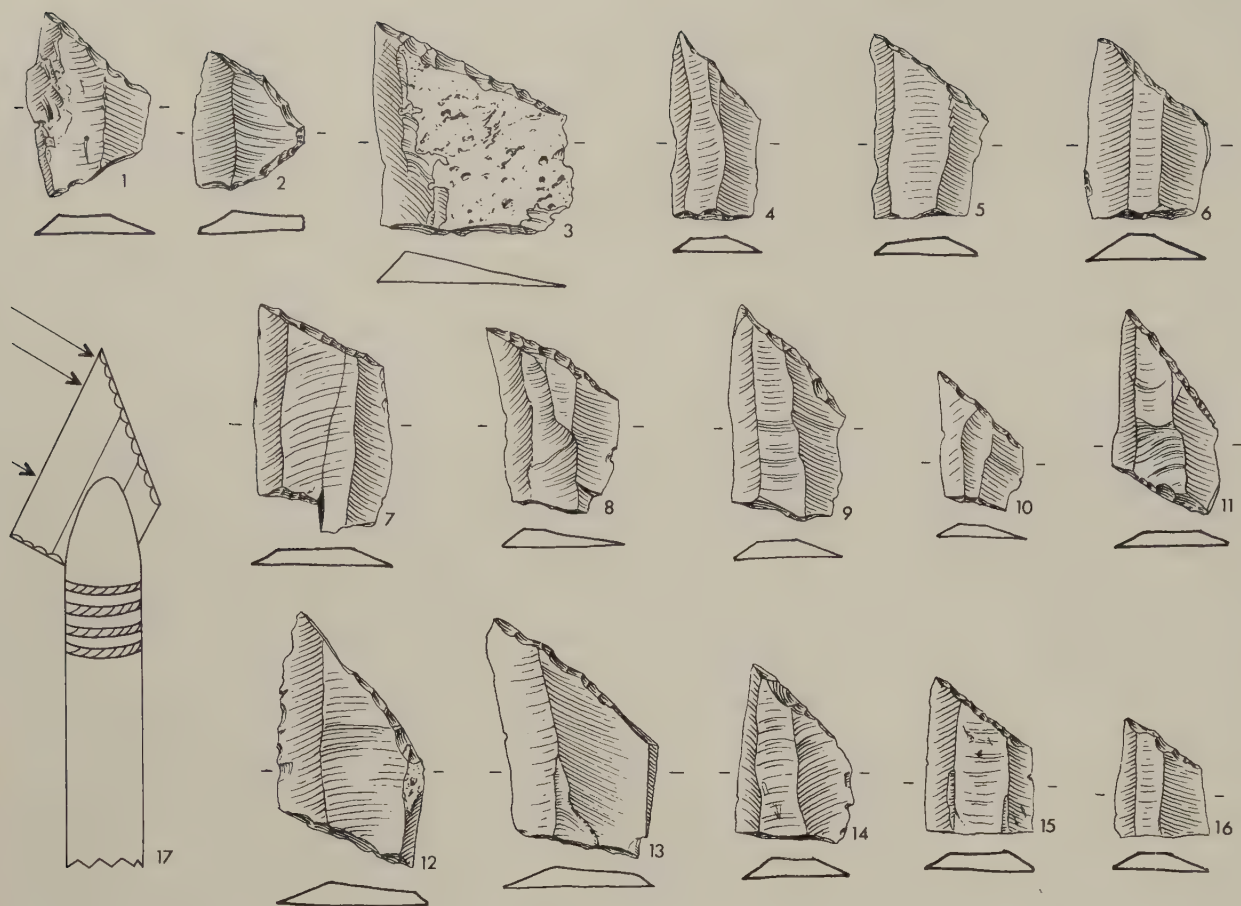


Fig. 41. Ageröd I:B. Broad trapezes (1-13) and semi-manufactures (14-16). 1-2: type 1, 3-9: type 4 and 10-13: type 5. 1:1.

Table XVII . Ageröd I:B. Mean values of trapezes in cm.

Types	$\bar{L}$	$\bar{W}$
1-3	2.1	1.3
4	2.2	1.4
5	2.1	1.4
Σ	2.2	1.4

The angle formed by sides A and D is called v^1 . Certain differences in this angle are noted in types 4 and 5 respectively. In type 4, the variation is 35° - 70° , with a mean of 52° ; in type 5 it is 30° - 65° , with a mean of 42° (Fig. 43). The trapeze typology published by G.E.E.M. divides these two types into subtypes according to whether v^1 is less or more than 45° . Only 5 examples (8%) of type 4 trapezes, but 6 examples (40%) of type 5 trapezes belong to the former group. In other words, type 5 is more pointed than type 4.

No limit based on any absolute degree-value was determined for the angle called v^2 , formed by sides A and B. It depends on the deviation of side B from the horizontal plane as plotted in relation to the length of W. Fig. 43 illustrates v^2 of types 4 and 5. It emerges that only a single example of type 4 has an angle corresponding to the variation range of type 5.

Fig. 43 illustrates also that the majority of type 5, namely 12 items, exhibit an v^2 value well in accordance with the maximum value of type 4. Thus, no marked deviation in the distribution based on this angle can be stated. The mean value of v^2 is 93° for type 4, and 112° for type 5. The table illustrates equally that the deviation from the horizontal plane of type 4 means mainly a blunter angle v^2 .

Few of the micro-burins can be associated with the broad trapezes (Chapter 8.4.2). A close study of the latter was found to offer some insight into the manufacturing process. An example highly relevant to such study is illustrated in fig. 41:7. The trapeze consists of two parts, found in two adjacent squares in the culture layer, approximately 1.5 m from each other. The retouched side D is common to both of them. Side B is retouched in two different levels with a break between the two individual trapezes to be. The

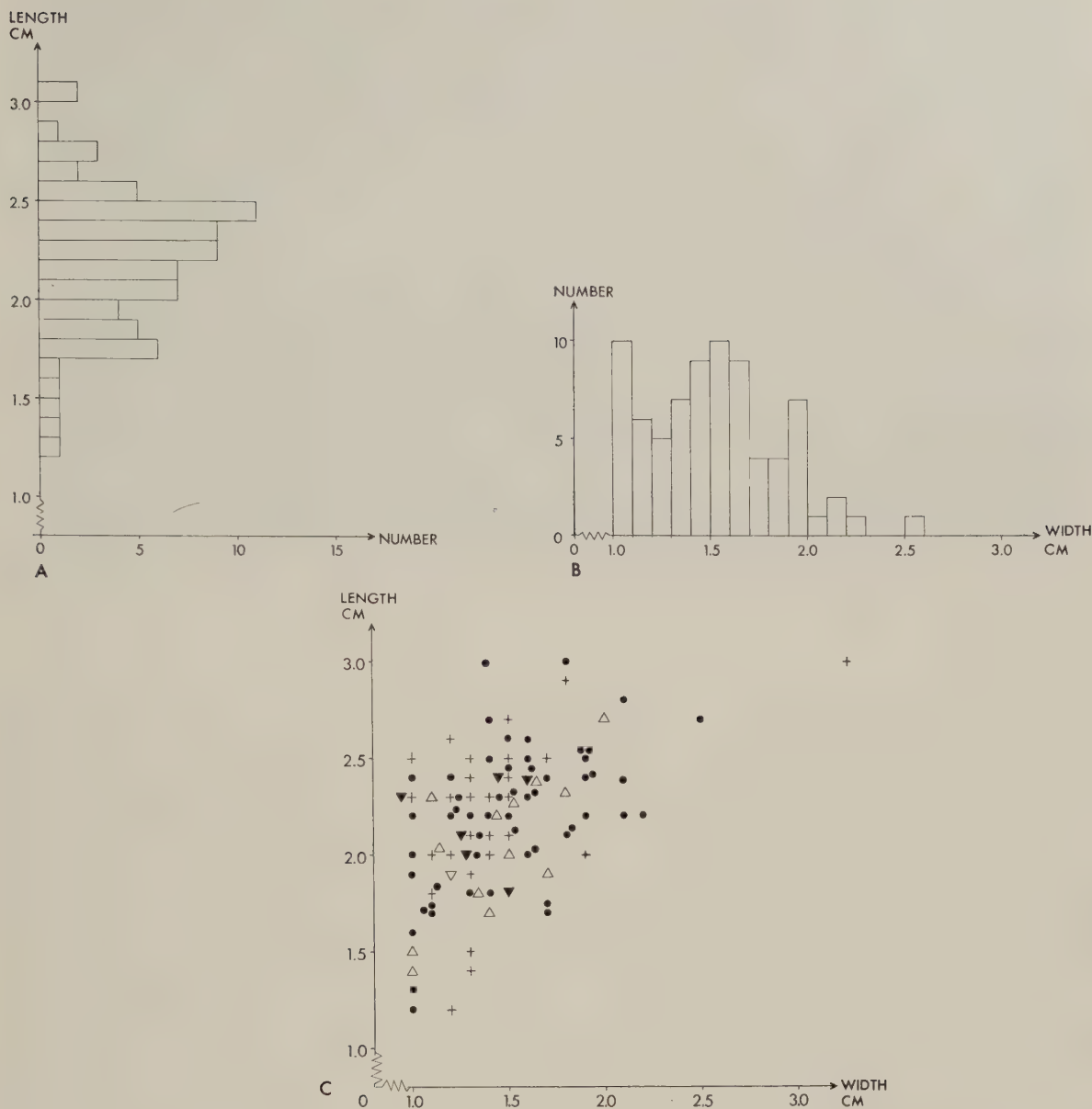


Fig. 42. Ageröd I:B. Length (A), width (B) and their correlation (C) of broad microliths of types 1-3 (triangles), type 4 (dots), type 5 (triangular contours) and semi-manufactures (crosses).

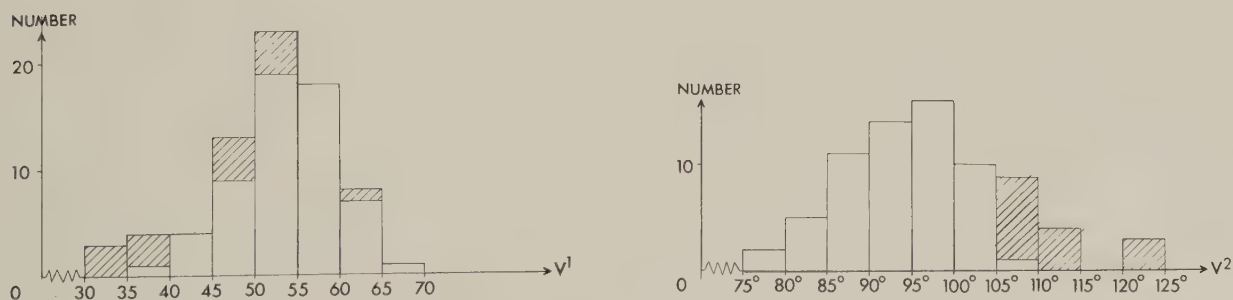


Fig. 43. Ageröd I:B. Distribution of v^1 and v^2 of trapeze types 4 (open bars) and 5 (hatched bars).

whole process is interpreted so that the first step in the preparation was the retouching of side D. In working on the opposite side B, the flint broke in two parts, whereupon the larger left part was deemed still usable and provided with new retouch. In doing so, the trapeze became considerably shorter, which may be indicative of endeavouring a certain proportional relation of L to W. Similarly, the loss on the short cutting edge C seems not to have influenced the sphere of function of the trapeze.

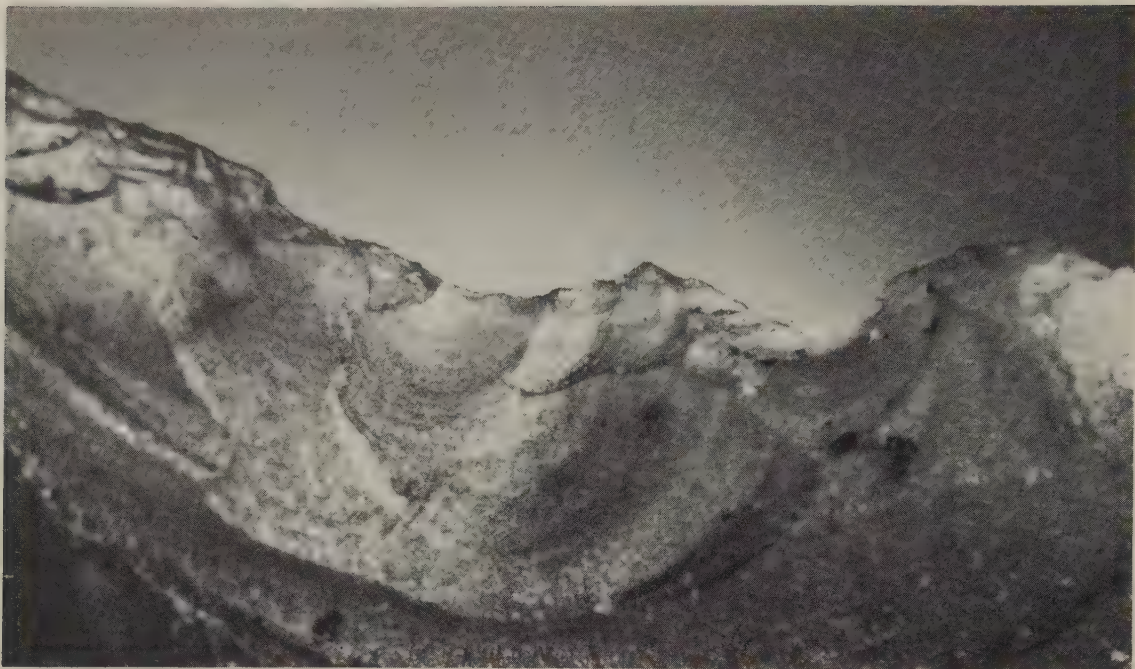


Fig. 44. Ageröd I:B. Traces of wear on a broad microlith of type 4. 20 x.

In spite of the paucity of micro-burins, preserved facets, i.e. traces of burins, were observed on 8 trapezes, all belonging to type 4. On these, the trace of fracture is next to the intersection of side D and A. Thus, it can be stated that 10% of the trapeze material was produced by micro-burin technique. On a few examples of type 4, side B is provided with a partial retouch - that is to say, a minor stretch, in this case close to a corner, is not retouched. Judging by the unretouched part, the primary step in fashioning this side consisted of a square break. Only 2 examples, both of type 4, exhibit a left-oriented retouch on side D.

Twenty-seven blade fragments, 5 from layer 1 and the rest from layer 2, differ from blade knife fragments with oblique retouch. They are not only thinner; the main difference is that the retouch is straight and even. They are considered to be trapezes lacking retouch on their base. The method of subjective selection certainly has its pitfalls, but there are certain observations supporting this opinion. On 5 examples or 19% of the total, a facet caused by a micro-burin break is preserved. These flints may be interpreted as semi-manufactures lacking total retouch on side B. A further support in favour of the classification is the proportional relation between the distances L and W (Fig. 42:c). It shows agreement with the true trapezes, as illustrated by the mean values of L and W - 2.2 cm and 1.4 cm respectively - precisely the values obtained for true trapezes. All except one exhibit a right-oriented retouch on side D, and this may also be regarded as an important argument in favour of the interpretation presented here.

Table XVIII. Ageröd I:B. Distribution of wear on broad trapezes.

Type	Position													Σ	
	Entire A			Upper part of A			Lower part of A			Entire C			Upper part of C		
1-3	1	3													4
4	4	17	4	1	4	4				1	2	1	2	1	34
5	2	1	3		3	1	1	1							12
Degree of wear	1	2	3	1	2	3	1	3	1	2	1	2	3		

Two functional spheres have been advanced for the trapezes - as arrowheads and as knives.³⁶ The range of function of the transverse arrowhead is fully clarified through finds from bogs in Denmark and northern Germany.³⁷ This holds true to a certain extent for the oblique arrowhead too. An oblique arrowhead found at the Kongemose site was wedged in an upper arm bone in such manner that it must unmistakably have functioned as an arrowhead.³⁸ The force of impact of the projectile against the bone was strong

enough to shatter the flint.

To call sides A and C unretouched is not quite correct. They, too, are provided with retouch, but it differs both in shape and extent from that of sides B and D. Deliberate retouch on side C occurs in six cases, four of which belong to type 4. However, in none of these cases does the retouch extend over the entire length of the side. On one trapeze of type 4 there is retouch on a minor part of side A next to the point. Retouch of wear was observed on 50 trapezes, distributed as in table XVIII. Only seven of these exhibit retouch on side C, in each case in combination with traces of wear on side A. On 13 examples, the traces of wear are concentrated on the pointed part. On the remaining items the traces of wear run for the whole length of side A, but are for the most more numerous and larger in size near the pointed part.

This form of traces of wear is not in any way distinctive for the types of trapezes in question. Clark has proposed a reconstruction as arrowheads according to fig. 41:1.³⁹ His interpretation of how a trapeze was fastened onto a shaft would result in just the kind of traces of wear which are found in the present material. By this method of shafting, the trapeze can be utilized as a point, a cutting edge and a barb. When in use, the point and side A were exposed to considerable stress resulting in a split, while side C remained better protected. This is in agreement with the observed traces of wear on the trapezes. Both in shape and extent the traces of wear on two trapezes of type 4 are clearly different from those on the rest. Fig. 44 illustrates how trapeze-shaped splinters have been detached one of these two examples. The central part of the side in question was particularly exposed to stress. The shape and position of these traces of wear are important in arguing the interpretation of trapezes as arrowheads rather than as knives. The cutting edge of a knife would exhibit a more even distribution of traces of wear and over a longer stretch of side A. The trapeze-shaped, flaked splinters are the result of direct pressure and not of a cutting motion. Such concentrated impact may ensue when, e.g. an arrowhead comes into contact with the skeletal parts of the prey. The deliberate retouch found on side C of a few examples is probably explainable through the fastening to the shaft. The application of retouch at this point constitutes a precaution against the flint - as a consequence of a forceful push - cutting into the shaft. Also, it made it easier to continue the winding of the fastening material on the flint without risk of too much wear too soon.

The symmetrical trapezes of the material might have been shafted in the same manner as the transverse arrowheads. Due to their somewhat differing proportions they would have been fastened less stably.

Eleven of the examples here called semi-manufactures show traces of wear in exactly the same way as those found on true trapezes. This means that they could hardly be termed preparatory semi-manufactures, but were used just like the true trapezes. They are primarily relevant in a functional analysis, but when studying the morphology of the trapezes as compared to material from other settlement sites, they will be left out.

8.4. Micro-burins

In the previous work dealing with the flint material from Ageröd I the micro-burins constitute a minor part of the finds. Although this form had long ago been distinguished on the Continent and also presented in South Scandinavian treatments of flints by Mathiassen, it seems that uncertainty about it prevailed for a long time.⁴⁰ This was particularly true of small examples of the type. It happened time and again at investigations of Mesolithic settlements that when the material was sorted out, flakes and waste products were separated from the rest and thrown away. When this happens, the researcher faces insolvable problems regarding the factual occurrence of a certain type of object, for instance micro-burins, which were disregarded at the time of the excavation and thus are lost.⁴¹ At the Ageröd investigations, on the other hand, all settlement remains were preserved and taken care of. In order to try to distinguish i. a. additional micro-burins, the material from Section B was examined once more. As a result, several flints were determined to be micro-burins, and a total of 14 examples or, in relation to the microliths, 11%, were identified. In many settlement materials the micro-burins are the smallest recorded flint type bearing traces of intentional dressing. Therefore, the frequency of micro-burins is often in relation to the number of small flint objects in the find material. On the basis of this observation special care was taken to collect even extremely small flints in the 1972-73 investigations. The effort was successful as may be seen from the high frequency of micro-burins. The result was a marked increase in the relative proportion as compared with the narrow microliths from the same excavation area, namely 55%.

It follows then that a comparison of the frequency of micro-burins of two or several settlements has very little value or none at all, if there is reason to assume that the method of excavation was not equally exact at all sites.

Taking the final product, namely the microliths, as the point of departure, the material was divided into two parts, depending on whether the initial form had been a micro-blade or a blade. The former group is termed narrow micro-burins whose width is less than 1 cm, while the latter are termed broad

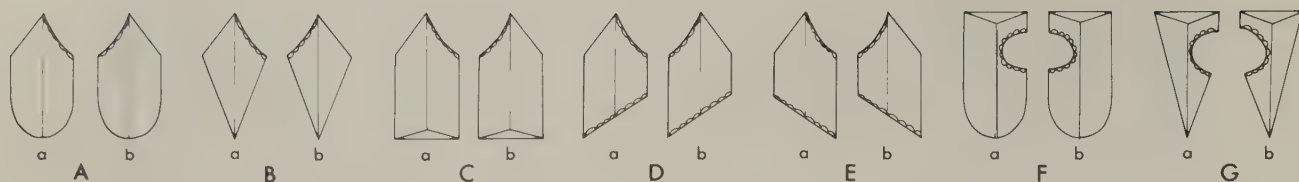


Fig. 45. Types of micro-burins.

micro-burins whose width is 1 cm or more.

8.4.1. Narrow micro-burins

Two main groups of narrow micro-burins are distinguished. The largest group is denoted by figures ranging from A to E. These are waste products of microlith production, where the desired effect, namely a break in the part weakened by concave retouch, was achieved. The other, smaller group, i. e. F-G, includes those flints which were equally weakened, but where the break occurred above the intended point. Both groups are of equal value as proof of microlith production. The difference between the two groups lies in the fact that while the first group, producing waste products of types A-E, resulted probably in usable products, this would hardly have been the case in the second. Consequently the relation of micro-burins to microliths should not be estimated to more than 40%.

The micro-burins themselves were divided primarily according to which part, namely percussion bulb or distal end, was detached. The sub-groups a and b respectively indicate from which side of the flint - its dorsal face towards the spectator - retouch was applied (Fig. 45):

Type A: Produced when the percussion bulb was detached

Type B: Produced when the distal end was detached.

Type C: Represents those micro-burins which exhibit a second fracture - on the opposite end to the intentional fracture - and thus could only be classed into type 1 or 2 on the basis of subjective evaluation.

Types D and E: Waste products resulting from a shortening of already finished microliths. The sub-groups Db and Ea are of special interest. They are waste products from a shortening which moreover changed the microlith from a right-oriented into a left-oriented item or vice versa.

Type F and G: As types A and B respectively but where the break occurred above the intended point.

Table XIX. Ageröd I:B. Distribution in layers and types of narrow micro-burins.

Layer	Type														Σ
	Aa	Ab	Ba	Bb	Ca	Cb	Da	Db	Ea	Eb	Fa	Fb	Ga	Gb	
1	76	10	8	9							21	2		2	128
2	358	30	38	60	11	1	5	1	1	1	108	18	3	10	645
3	3		1	1											5
Σ	437	40	47	70	11	1	5	1	1	1	129	20	3	12	778

It can be readily seen from table XIX that micro-burins of type A, retouched on the right side, i. e. when the intention was to produce a microlith with left-oriented retouch, are clearly in predominance. This favouring of retouching on the right is reflected in every type save type B. There is a pronounced difference in the relationship between right and left retouch depending on whether the base or the point was removed. The proportional relation of left-oriented retouch, based on all the layers added together, is 8% for type A and 60% for type B. There are several examples of argumentations based on the procentual relationship between right and left-orientedly retouched artefacts, inter alia microliths and blade arrow-heads, in the subject literature.⁴² The occurrence of the two different types of retouch would be an indication of both right-handed and left-handed persons having manufactured the same types of artefacts. Such reasoning may be considered realistic when speaking about sites presumed to have had a large population. But the author does not have much confidence in drawing the same conclusion in the case of minor settlements exhibiting both variants, especially when one of the types is represented by one or a few examples only. This would suppose a stereotyped action when manufacturing microliths. In reality, it is no problem either for a left-handed or a right-handed person to produce either variant. The solution of the riddle is the

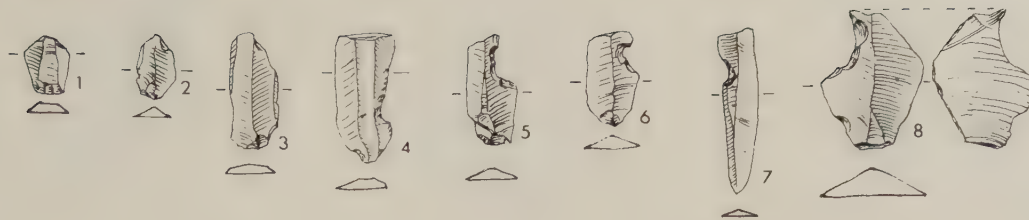


Fig. 46. Ageröd I:B. Narrow micro-burins (1-7) and broad micro-burin (8). 1-3: type Aa, 4-6: type Fa, 7: Gb and 8: Ab. 1:1.

way in which the primary material, in this case the micro-blade, is held in the hand. All inward retouching was applied starting from the ventral face of the micro-blade. If this is held in the proximal end by a right-handed individual, the result will be a micro-burin with retouch on the right side. If the micro-blade is held in the distal end, the result will be the opposite.

The retouch was led in a few cases over more than one half of the width of the micro-blade. In most cases the depth of the retouch is less than one fifth of the width of the micro-blade at the point of fracture. In order to facilitate continued work, the micro-burin was in most cases removed by means of a percussion or pressure applied obliquely at right angles towards the long axis of the micro-blade. This resulted in a facet oblique to both the long axis and the original working face. Taking the total number of all types from all layers, 12% of the micro-burins are squarely fractured in relation to the long axis. This fact, and the occurrence of types F-G, indicate the difficulty of handling small flints. In sub-type Fa there are 9 examples where the retouch was obviously found to be faulty and was thereafter worked over secondarily with another retouch above the first. The fracture was likewise misplaced. Two examples each of types Aa and Ba show the above described re-retouching having had the desired result. Type C may possibly be production debris of a second attempt to divide a micro-blade according to the micro-burin technique.

Length and width of the types with high frequency are illustrated in fig. 46. In spite of the differences in number, it can be seen that type A is shorter but wider than type B. This conclusion seems fairly natural in considering the premises of the use of the micro-burin technique. The main objective was to detach the percussion bulb, which was hard to trim. Of course, this could have been done by breaking the micro-blade squarely, but the advantage of the micro-burin technique was that the point of fracture could be precisioned and also that further shaping was made easier. To judge by the material it was less common to detach the opposite, pointed end. This variant meant detaching first of all a long and narrow point, whereby a shorter, wider and therefore more resistant product was obtained. So as to detach the percussion bulb but still utilize the wide part below it, the micro-burin was made as short as possible.

The variation in length of types Aa-b is 0.4-2.3 cm, the mean 0.9 cm. The length variation of types Ba-b is 0.4-2.3 cm, the mean 1.1 cm. The variation in width of types Aa-b is 0.3-0.9 cm, the same as for types Ba-b, while the mean of the former is 0.5 cm and of the latter 0.4 cm.

In spite of no effort being spared to gather even very small flints, the number of micro-burins does not amount to the figure it should in the production of all microliths found in Section B. On re-examination of the excavated soil from one square metre, no less than 21 micro-burins were found (Appendix I). They represented types A, B, F and G. The majority of these were less than 0.5 cm long. Not counting types F and G, which, as mentioned, are uncertain as to continued shaping into microliths, 17 micro-burins are left. They should be compared to the 28 recorded in the same square metre at the investigation. The relation of the micro-burins found later on to those excavated is 60%. Supposing that this proportional relation were relevant for the whole area excavated in 1971-73, the number of micro-burins would amount to 960, whereof 776 would be production debris of detaching the percussion bulb. These figures may be related to the number of microliths, found in the same area, where the proximal end was detached. The relative number of micro-burins would then amount to 60% of what the factual total of micro-burins resulting from the production of all microliths found in the area should be. This is to be compared to the 38% obtained on the basis of only those micro-burins that had been excavated.

Several interpretations of these calculations are possible. The whole thing may be seen as an indication of not all microliths having been manufactured on the site. Or, it may well be that the plotting of the

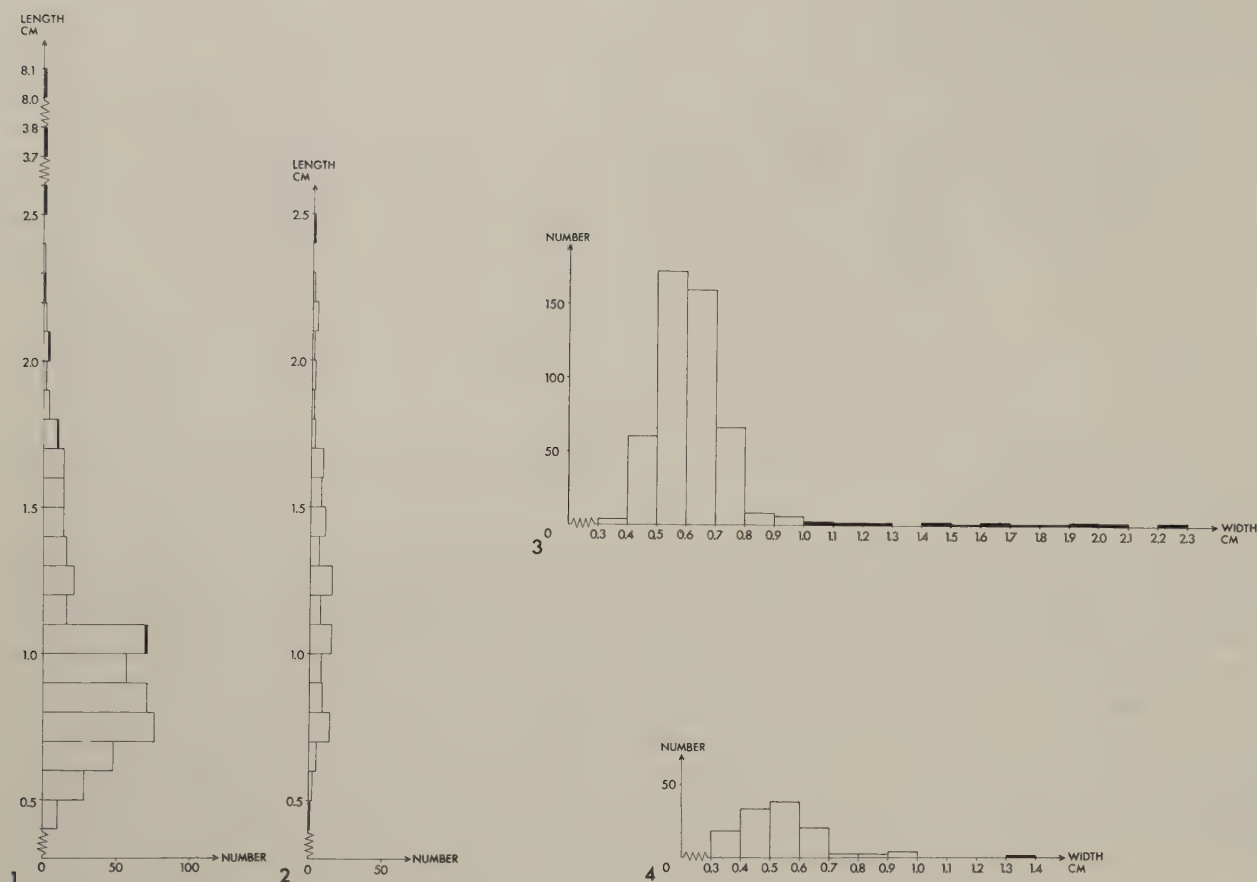


Fig. 47. Ageröd I:B. Length and width of micro-burins type A (1+3) and type B (2+4). Unshaded bars represent narrow micro-burins, shaded bars represent broad micro-burins.

frequency of the secondarily found micro-burins for a single square metre is too low. Factors like an uneven distribution may be important, but would hardly explain the entire difference in frequency, since some of the microlith fragments probably went unnoticed.

8.4.2. Broad micro-burins

Broad micro-burins are differentiated from narrow micro-burins by their width exceeding 1 cm. The group contains only 13 examples, all from layer 2: 9 of type Ab, 1 of type Ba and 3 of type Cb. These figures are surprisingly low in comparison to the total number of broad microliths. The relation between the two is only 16%. On account of their size, the number of unnoticed broad micro-burins should be very small. The percentage is actually even lower in consideration of the circumstance that certain trapezes, in particular type 5, as experiences from younger find materials showed, necessitated two micro-burin fractures. Nor can the divergence be explained by difficulties in identifying the type, since the greatest care was taken while sorting the flints. One possibility is that at first there was a certain indecision how to manufacture these broad microliths. This would explain to a certain extent why true broad micro-burins are difficult to identify.

The variation in length is 1.0–8.0 cm, the mean being 3.2 cm, the variation in width is 1.0–2.2 cm, the mean 1.5 cm (Fig. 47).

8.5. Flake scrapers

Flake scrapers comprise those flakes that are provided with a retouch measuring more than 3 mm in height.⁴³ This definition diverges somewhat from that given by Malmer's stating that retouch on these artefacts is made from the ventral face only. 7 percent of the flake scrapers exhibit retouch higher than

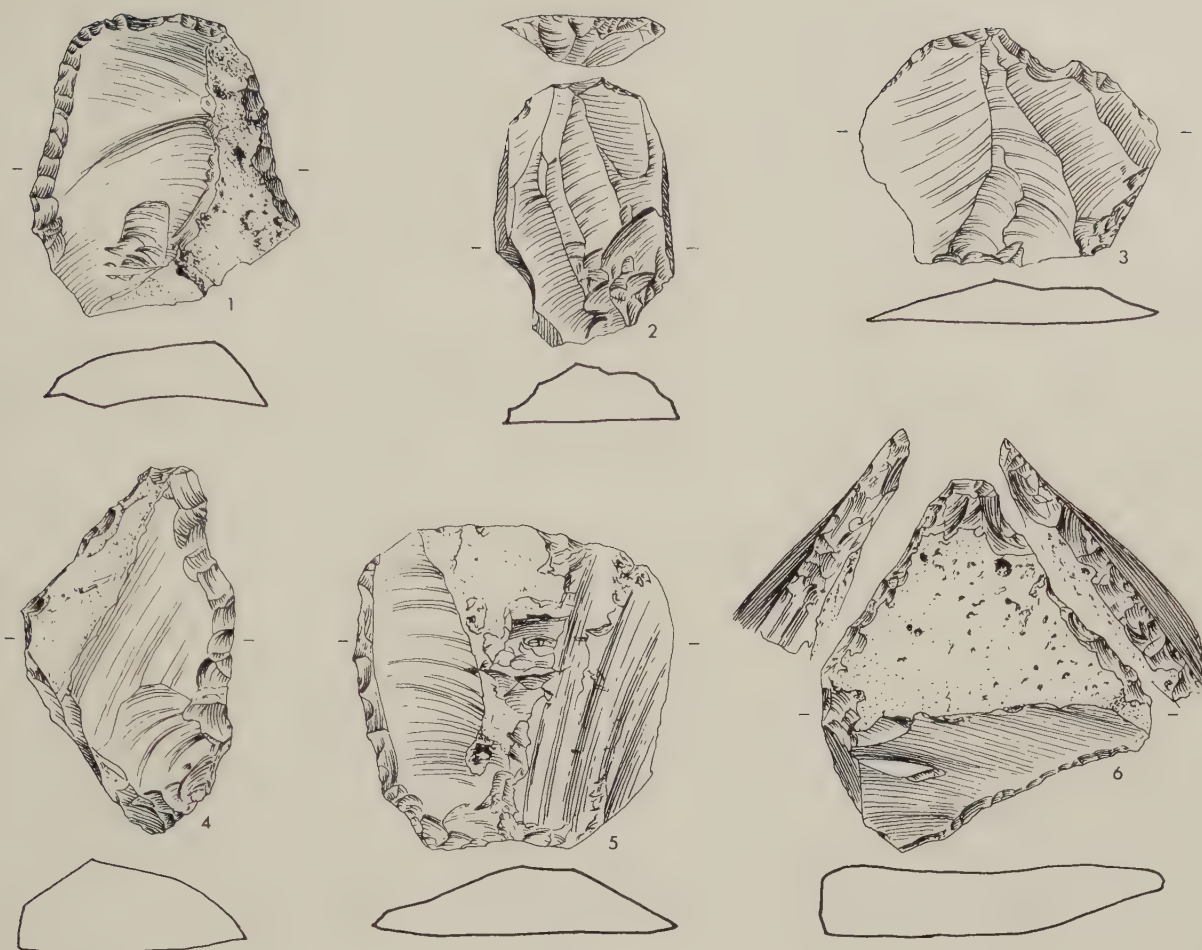


Fig. 48. Ageröd I:B. Flake scrapers. 1-3: type 1, 4-5: type 2 and 6: type 3. 1:1.

3 mm but struck from the dorsal face. Some flints are shaped with a slightly concave ventral face. Retouching from the reverse face would result in a completely different shape of these examples. In other words, retouch was applied along the edge most suited for the purpose.

Flake scrapers are divided into three types according to shape and position of the retouch (Table XX.).

Table XX. Ageröd I:B. Distribution in types and layers of flake scrapers.

Type	Layer			
	1	2	3	
1	21	63		84
2	7	20	1	28
3		2		2
	28	85	1	114

Type 1: Scrapers with retouch at the distal end.

Type 2: Scrapers with retouch between proximal and distal end.

Type 3: Scrapers with retouch running the whole length of the edge.

In more than one respect, scrapers are a heterogeneous group. Their thickness, for instance, varies between 0.4 cm and 1.4 cm with a mean of 0.7 cm. The oval shape is predominant, but variations ranging from complete circles to triangular forms occur (Fig. 48). Length and width respectively are correlated in fig. 49. The length is measured parallel to the striking direction. In spite of their wide range of variation in shape, the scrapers are a compact form. 61% of them fall within the limits Welinder stated for small round scrapers.⁴⁴ According to Malmer's definition, 17% belong to the oblong type, the rest to his round type.⁴⁵ Type 2 alone tends to be somewhat longer and narrower than the rest, probably because long and narrow flakes and waste-products were preferred. The difference, however, is not significant enough to matter in the total distribution. The difference between length and width is minute,

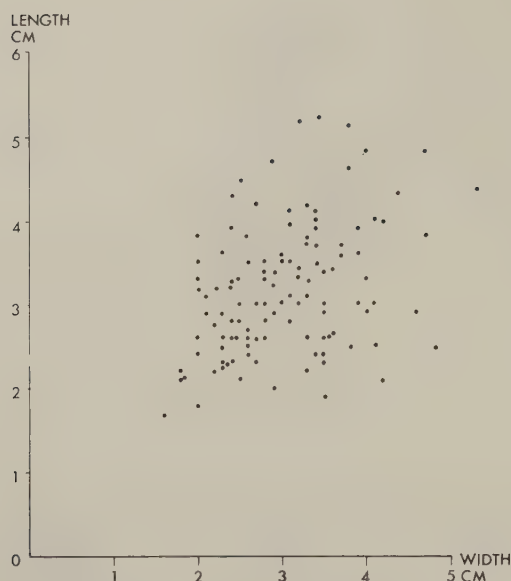


Fig. 49. Ageröd I:B. Length-width correlation of flake scrapers.

as illustrated by the mean of 3.0 cm common to both, and the range of variation, 1.5-5.5 cm.

Thirteen percent of the scrapers have no percussion bulb. On a few examples, the position of the retouch proves that it was applied after detaching the percussion bulb. Eight scrapers in layer 2 and two examples in layer 1 of type 1 are provided with a small protuberance whose divergence from the contour does not exceed 1 cm. The retouch around the protuberance indicates an intentional shaping.

Of the two type 3 scrapers, one is completely circular, the other triangular.

The dominant type 1 is the type often associated with the term flake scrapers. The minority is represented by those having a symmetrical retouch with a maximum height opposite the percussion bulb. The majority exhibit a suddenly terminating retouch, or retouch of varying height. Among the type 2 scrapers, on the other hand, the scraping edge is more uneven. Five examples of this type have retouch on both long sides, separated by an unworked stretch around the distal end of the scraper.

The contour of the scraping edge largely follows the edge of the flint, and for this reason the majority of scrapers with a concave scraping edge belong to type 1, while a straight scraping edge occurs most frequently among type 2 scrapers. However, there are some exceptions to this rule - a convex scraping edge occurs on 44 examples, a straight edge on 37, a concave edge on 7, and an uneven contour on 26 examples. Convex and straight scraping edges are the most common, while scrapers with a concave edge are few in number. Those with an uneven contour are frequently produced by striking both high and broad flakes. The mean length of the convex edge, 3.1 cm, is somewhat lower than that of the straight edge, 2.5 cm, while the uneven edge has a mean of 3.2 cm and the concave edge, 2.0 cm.

8.6. Blades with end retouch

The group blades with end retouch comprises artefacts which are usually called blade knives and blade scrapers. Based on measurements of morphological elements, an attempt was made to study objectively eventual groupings within the material. Seen from a morphological point of view, the departure point of a typological system ought first of all to be differences in length of the retouches and their angle in relation to the long axis of the blade. Glancing briefly at the length of retouches, one group can definitely be differentiated. This consists of blades exhibiting retouch running diagonally in a straight or curved contour from the point of the artefact to its base. The remaining blades, clearly dominating in number, are provided with retouch cutting across the distal end of the blade and forming an angle measuring less than 90° with the long axis of the blade. In order to differentiate sub-types within this group, the angle formed by the retouch and the long axis of the blade was measured. Fig. 50:1 registers all measurements taken, according to whether retouch was left or right-oriented. In both cases, the variation in degree falls within 10° - 90° . There is no substantial difference between the number of right and left-oriented retouches respectively. In both cases, but particularly in the case of the right-oriented retouch, there is a marked break in the otherwise evenly decreasing number at an angle of 60° . Similar results were obtained in a survey of an Ertebølle material.⁴⁶ There, however, the groupings on both sides of 60° are more accentuated.

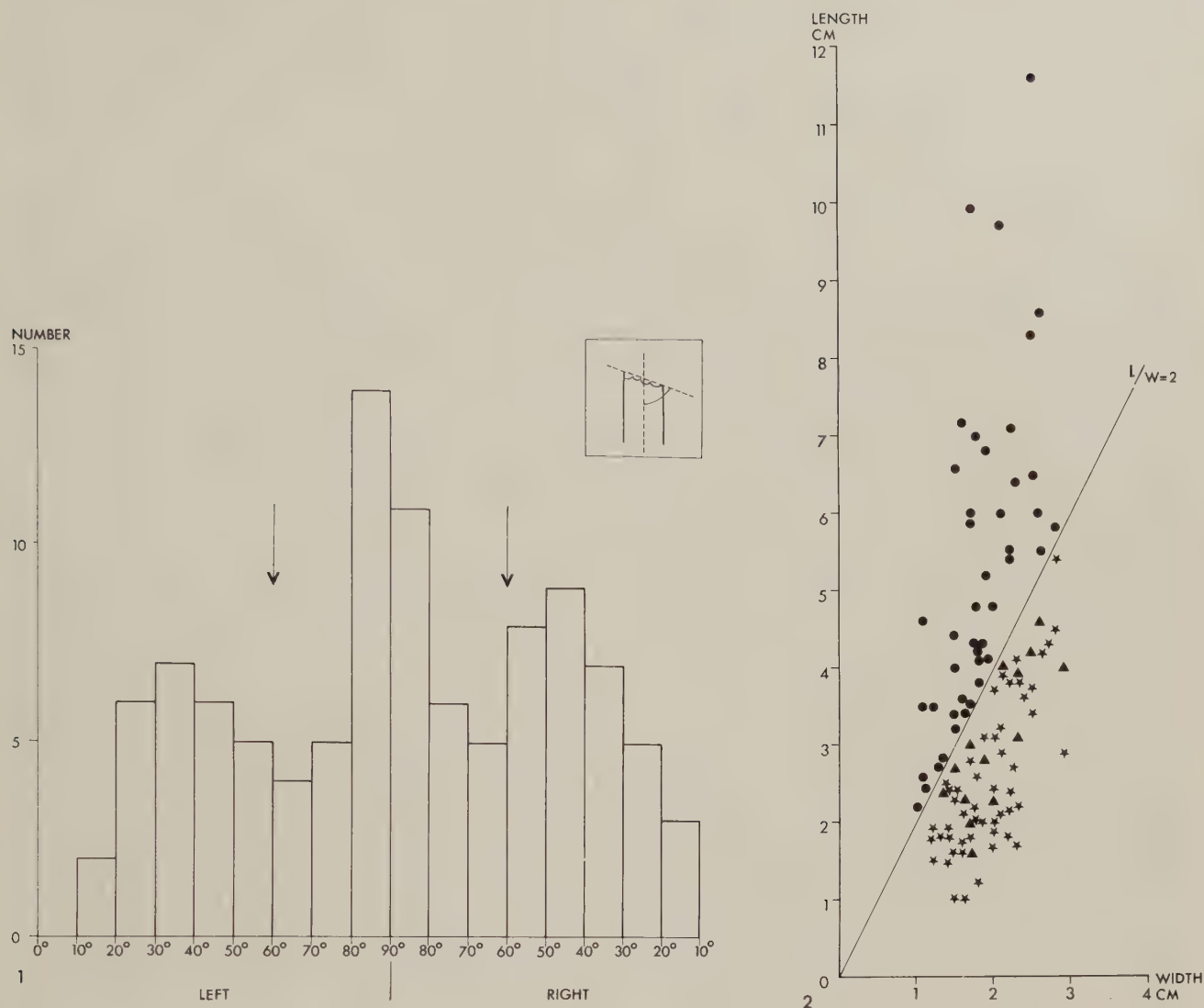


Fig. 50. Ageröd I:B. Angle of retouch in relation to long axis of blades with end retouch (1) and length-width correlation (2) of blade scrapers (dots) and fragmentary blade scrapers with (triangles) and without percussion bulb (stars).

Based on these results, the retouched blades, in relation to the 60° mark, are subdivided into two groups. Those with an angle exceeding 60° are defined as blade scrapers, while those with an angle measuring less than 60° are defined as blade knives. The criterion for differentiating blade scrapers and blade knives respectively is thus the shape given it intentionally by retouching.

8.6.1. Blade scrapers

Typological treatment of blade scrapers is based on the eventual occurrence of retouch - apart from end retouch - and its contour.⁴⁷

Type 1: Blades provided with end retouch only.

Type 2: Blades provided with both end retouch and side retouch

a: Convex end retouch

b: Straight end retouch

c: Concave end retouch.

Table XXI. Ageröd I:B. Distribution in types and layers of blade scrapers.

Type	Layer			Type	Layer		
	1	2			1	2	
1a	3	19	22	2a	1	3	4
1b	3	8	11	2b	1	2	3
1c	1	3	4	2c	-	1	1
	7	30	37		2	6	8

The dominating type is the blade scraper with convex end retouch (Table XXI). The maximum length and maximum width respectively varies from 2.0 cm to 11.6 cm and from 1.1 cm to 2.9 cm; the mean values are 5.2 cm and 1.8 cm. The correlation value of 8 blade scrapers borders on the length/width index of blades (Fig. 50:2). 33 scrapers are manufactured from A blades, while the remaining 12; 12 examples are deemed to be B blades (See List of definitions).

In addition to the group with end retouch there is another, consisting of blade fragments with end retouch according to the definition for blade scrapers, but which according to the relation of length to width belongs to flake scrapers. On the other hand, their length/width correlation diverges from that of the flake scrapers. As can be seen in fig. 50:2, the width of the blade fragments agrees with that of the blade scrapers.

Compared with the distribution of flake scrapers, that of blade fragments shifts towards the line length/width = 2 (Fig. 49). Measurements of the scraped retouch angle showed a difference between flake and blade scrapers (Fig. 51). The angle of both types of scrapers varies between 90° and 50°, but within these boundaries the differences are pronounced. The angle of retouch, with a mean of 73°, is wider for the blade scrapers than the more acute angle of 66° of the flake scrapers. This observed difference between blade and flake scrapers was used when ranging the blade fragments (Fig. 51). The mean value of this group's scraping angle is the same as that of the blade scrapers, i. e. 73°. The qualities observed, namely shape, position and angle of the retouch led to the ranging of blade fragments with scraping retouch together with blade scrapers, in spite of the length/width relationship. These blade-fragments provided with scraping retouch appear to be parts of blade scrapers broken in use. Scrapers manufactured from blade fragments with preserved percussion bulb show that the length was of minor importance, while the application of retouch followed a definite pattern. Adding together blade scrapers and fragmentary blade scrapers, the type distribution is shown in table XXII..

Table XXII. Ageröd I:B. Distribution in types and layers of both blade scrapers and fragmentary blade scrapers.

Type	Layer		Σ	Type	Layer		Σ
	1	2			1	2	
1a	7	39	46	2a	2	14	16
1b	6	13	19	2b	5	10	15
1c	3	8	11	2c	-	4	4
Σ	16	60	76	Σ	7	28	35

The same proportions prevail as in the distribution of blade scrapers, one more indication corroborating the above determination. It has to be noted, however, that type 2 increases in proportion - that is to say, side retouch occurs more frequently among the added fragmentary blade scrapers than among the whole blade scrapers.

When classifying blade fragments with scraping retouch, a difference between flake scrapers and blade scrapers emerges, namely that the majority of examples belonging to the former type exhibit a less acute scraping angle than the latter (Fig. 51). It may be suspected that this differentiation is based on the functional requirements for the two forms of scrapers. Ethnographic studies have proved that the angle of the scraping edge is connected with the material to be worked.⁴⁸ The studies were completed with practical experiments, where various materials were treated with scrapers of varying angles to their edges.⁴⁹ The report on Broadbent's and Knutson's experiment accounts for the effect of various materials on the scraping edge - thus, traces of wear from wood-working can be differentiated from those of skin and bone scraping respectively.⁵⁰ The best result, when working on wood, can be attained with a scraping angle of 70-80°, while the preparation of raw hide requires a less acute angle.⁵¹ Every flake and blade scraper's scraping edge was microscopically examined to determine their functional sphere with the aid of micro-traces. Experiments conducted by the author proved that traces of wear occurring on scrapers of quartzite have direct parallels in the respective flint forms. The results are shown in table XXIII.

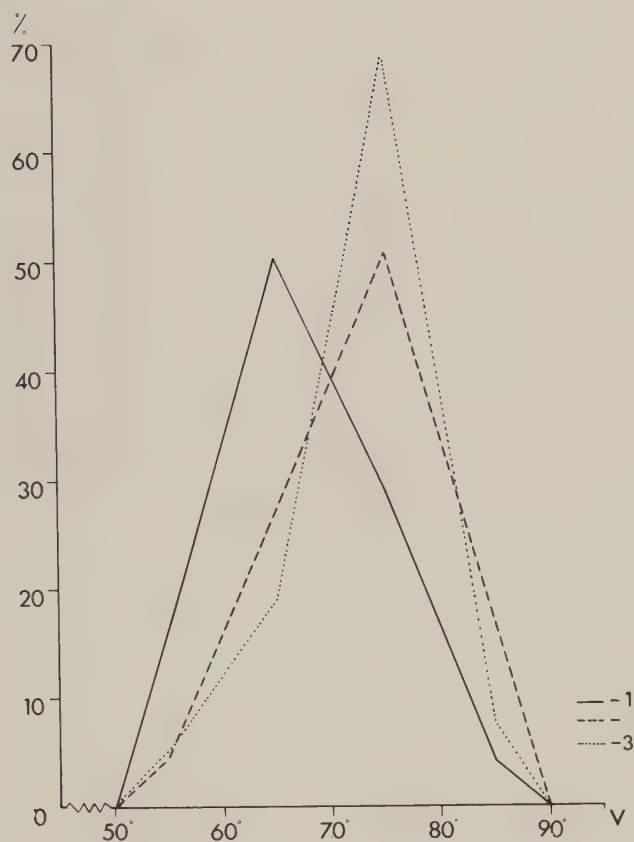


Fig. 51. Ageröd I:B. Distribution of scraping angle for 1: flake scrapers, 2: blade scrapers and 3: fragmentary blade scrapers.

Table XXIII. Ageröd I:B. Traces of wear on flake and blade scrapers.

	Flake scrapers		Blade scrapers	
	Number	%	Number	%
No traces of wear	18	15.8	19	17.1
Traces of wear				
uncertain	42	36.8	30	27.0
Certain	54	47.4	62	55.9

	Number	%	Number	%
skin	18	33.3	2	3.2
wood	30	55.6	60	96.8
bone	6	11.1	-	-

It emerges that identification proves most difficult among the flake scrapers, while a lack of retouch is documented more or less to the same degree in both types of scrapers. The distribution of the three types of traces of wear show interesting differences. In both types, examples with traces of wear from working on wood are most numerous, though the proportional values differ considerably. On the flake scrapers, traces of wear produced by the working of skin and bone are documented. On the blade scrapers, the former are identified in two cases only, while the latter are lacking entirely. This distribution is in accordance with the preceding reasoning regarding the correlation between the angle of the scraping edge and the function. Flake scrapers and blade scrapers were both used in scraping material of the hardness of wood, but flake scrapers were also used in scraping both harder and softer materials, namely skin and bone.

The acute angle applied for skin preparation seemingly poses an identification problem, since the great majority of scrapers having the obligatory retouch height of 3 mm are too blunt.

Empiric studies on scrapers have noted two factors relevant to the present material. In scraping skin, the best results are obtained when the scraper is held at an oblique angle - in relation to the direction of scraping - whereby stress on the scraping edge will be distributed unevenly.⁵² In our material, 60% of the flake scrapers showed traces of wear over the whole length of the edge, 18% a concentration on the left side of the edge and 22% on the right side. Quite likely most of the scrapers were used to the maximum, meaning that when the edge of the scraper became too worn, prehension was changed to obtain better results.

Also, it was found that scraping demanded surprisingly great effort even when working soft materials. For this reason some of the scrapers broke in spite of their compact shape.⁵³ A number of flake scrapers from Section B had part of the edge broken off, apparently as a consequence of scraping, since traces of wear could be seen up to the fracture. This observation may possibly explain the large number of scraping edges found on blade fragments, since a slender blade scraper would naturally tolerate even less stress.

In order to compare the above examination with other artefacts provided with a scraping edge, a random selection of 125 bulbar flakes and flakes with scraping edge - retouch D - was studied (Chapter 8.13). 19 (15%) of these exhibited frictional retouch without identifiable traces of wear. On 47 items (38%) with retouch the shape of the edge was such as to make a classification too uncertain. Of the remaining items, 13 (10%) showed traces of wear from skin working, 44 (35%) traces of wood working and 2 (2%) of bone scraping. The distribution of the degree of angle according to the worked material is recorded in table XXIV.

Table XXIV. Ageröd I:B. Distribution of degree of angle among bulbar flakes and flakes with frictional scraping retouch.

Degree of angle	skin	wood	bone	Σ
30-39°	4	1	-	5
40-49°	7	4	1	12
50-59°	1	8	1	10
60-69°	1	21		22
70-79°		8		8
80-89°		2		2
Σ	13	44	2	59

The distribution emerges very clearly. Repeated contact between flint and wood or bone results in frictional retouch visible to the naked eye, while wear of skin scraping is not. The latter form of frictional retouch could only be documented in those cases where the scraping edge of the flint had previously been retouched either by wear or intentionally. Thus, if a detailed examination of flint edges were to be undertaken, the percentage of flints used for scraping soft materials should increase considerably.

8.6.2. Blade knives

Blade knives are blades with end retouch and an angle measuring less than 60°. There were 12 examples in layer 1 and 48 examples in layer 2. The variation in length is considerable, from 2.6 cm to 10.3 cm with a mean of 5.4 cm (Fig. 53). The mean width is 1.8 cm. 45 knives are provided with retouch running over less than the half of the artefact's length - type 1 - while the length of retouch in relation to the maximum length of the artefact varies due to the angle of the retouch and the length of the knife, respectively. The length-width correlation is in fairly good agreement with that of the blade scrapers (Fig. 50:2). 13 knives (22%) have a retouch running over at least half the artefact's length - type 2. The retouch is usually straight or slightly convex. For this reason it is more unusual to find blade knives which have crescent-shaped retouch running along an entire side of the blade. Six examples (10%) have this shape. 65 percent of the blade knives have the percussion bulb preserved. On two of the remaining examples, it can be ascertained that the proximal part of the blade was retouched. One example is retouched on the proximal part in such a way as to indicate that it was meant to be retouch for shafting. One example is a combination implement. It has scraping retouch on one end and knife retouch on the other. One knife is provided with a number of symmetrically hatched notches on the back.

B-blades were the primary material for 9 examples, while 51 items, in their present state, show qualities characteristic of A-blades.

In addition to blade knives, there is a group of blade fragments exhibiting retouch which, according to the definition, agrees with knife retouch. If we compare the fragments and the blade knives proper in the



Fig. 52. Ageröd I:B. Blade scrapers (1-5) and blade knives (6-10). 1-2: type 1a, 3: type 1b, 4: type 1c, 5: fragmentary type 2a, 6-9: type 1 and 10: type 2. 1:1.

correlation graph, it emerges that the fragments - just as in the case of the scrapers - differ only in regard to length from the blade knives proper (Fig. 53). Counting all flints with knife retouch, the total is 78 examples (Table XXV).

Table XXV. Ageröd I:B. Distribution in types and layers of blade knives.

Type	Layer			Σ
	1	2	3	
1	12	45	1	58
2	4	16	-	20
Σ	16	61	1	78

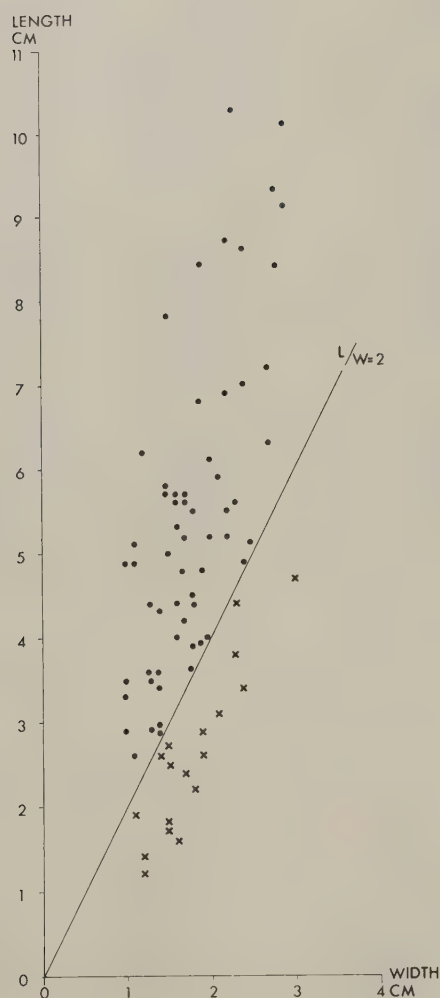


Fig. 53. Ageröd I:B. Length-width correlation of blade knives (dots) and fragmentary blade knives (crosses).

8.7. Burins and burin spalls

8.7.1. Burins

Burins are made of various primary materials. Table XXVI accounts for flint types for all burins found in Section B.

Table XXVI. Ageröd I:B. Primary material for burins.

Blades	29%
Blade fragments	42%
Bulbar flakes	11%
Flakes	18%

Blade fragments were the preferred primary material for burin preparation. Flakes were utilized slightly more than bulbar flakes. In total, 71% of the burins were made of blades. The high percentage of fragments may to a certain extent be explained by the fact that blade burins broke when used. But five of the blade fragment burins have cutting edges on both ends. This fact and the occurrence of burins on bulbar blade fragments are a definite proof of short and broad burins having had an important functional sphere. The mean length of these is 2.2 cm, to be compared with the mean length, 4.0 cm, of blade burins. However, the latter show considerable variation from 2.3 cm to 8.2 cm.

Burins are classified according to the position of the cutting edge in centre burins (1) and angle burins (2-3) (Table XXVII). All centre burins are made from bulbar flakes or flakes. They constitute a very small group compared to angle burins. The 224 angle burins are classified partly according to the number of platforms and partly to the number of cutting edges and the way they were dressed (Fig. 54).

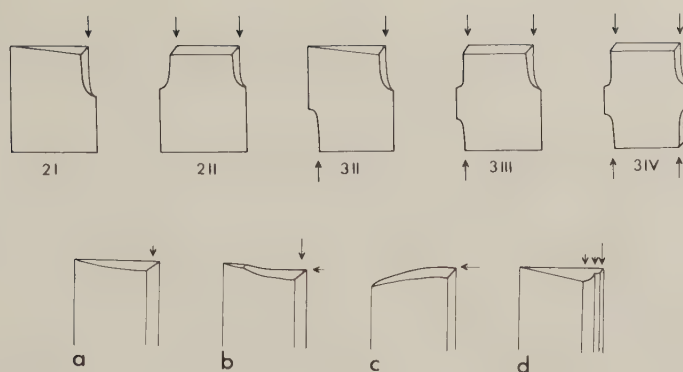


Fig. 54. The classification of burins.

Table XXVII. Ageröd I:B. Distribution in types and layers of burins.

Type	Layer			Σ	%
	1	2	3		
Centre burins	1	9	1	11	4.7
Angle burins	59	163	2	224	95.3
Σ	60	172	3	235	100.0

2. Burin with one platform only, against which percussion was directed.
3. Burin with two opposite platforms, against which percussion was directed.

- I-IV Number of dressed cutting edges on each burin
- a. One or two spalls were struck from a point on the platform made by a break or retouch.
 - b. Secondary dressing of the cutting edge by striking spalls in the same plane as the platform (dihedral burin).
 - c. Cutting edge shaped by directing a blow perpendicularly to the long axis of the platform (transverse burin).
 - d. Cutting edge shaped by striking three or more spalls (polyhedral burins).

Table XXVIII. Ageröd I:B. Distribution in types and layers of angle burins.

Type	Layer	Shaping of cutting edge				Number of burins
		a	b	c	d	
2 I	1	42		1		43
	2	115	6	5	2	128
	3	2				2
2 II	1	25	1			13
	2	42	1		1	22
3 II	1	4				2
	2	15	3	1	1	10
3 III	1	3				1
3 IV	1	4				1
	2	8				2
Σ		260	11	7	4	224

The figures in table XXVIII indicate the number of cutting edges. The column on the right indicates the number of burins arrived at by dividing the total number of burins by the number of cutting edges. By using this flexible typological system it is possible to record every type of cutting edge. In addition, it is also possible to record combinations of cutting edges. A rigid typological system would result in a considerably larger number of types. The clearly dominating type is the burin with only one cutting edge - 2 I. 77% of all burins belong to this type. The type next in size is 2 II a-d. 16%, consists of burins

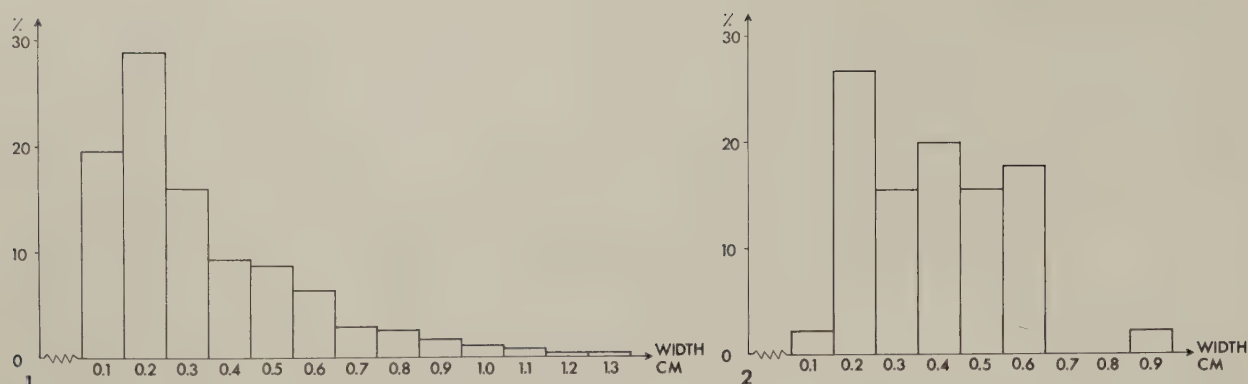


Fig. 55. Ageröd I:B. Distribution of width of cutting edges on burins (1) and on burin spalls (2).

with two cutting edges struck from the same platform. Burins with two opposite platforms constitute a relatively small group (7%). Four examples of 3 II type have diagonally opposed cutting edges.

As shown by table XXVIII, type 2 I shows the widest variation in regard to shaping of the cutting edge. Among burin types with two or more cutting edges, 3 II has most variation. Burins with varying shaping of their cutting edge belong to the type where burin spalls were struck from the same platform. The 2 II type, usually called double burin, shows little variation in relation to the number of items.

There is not a single case among burins where more than one cutting edge would belong to variants b-d. If we consider the various methods of shaping cutting edges, it emerges that type 3 III, in relation to the number of items by which it is represented, is the most heterogeneous. Five of the burins of this type are combination forms. Type 2I, on the other hand, displays the quantitatively highest values of cutting edge types b-d.

Nine percent of the burins are on one or two sides provided with retouch not directly connected with trimming the cutting edge. Three burins have deliberate retouch applied in such way as to indicate that these artefacts are combination implements; burin/flake scrapers.

One group consisting of 25 examples is of special interest. These are so-called rectangular artefacts, consisting of broken blades with - in several cases strongly pronounced - frictional retouch (Chapter 8.9).

For a discussion about the function of burins, not only the shape of the cutting edge, but also its width is important. This is shown in fig. 55. The range of variation in width is 1.2 cm, namely from 0.1 cm to 1.3 cm, the narrow cutting edges dominating (Fig. 55:1). One third of the burins have cutting edges varying in width between 0.1 cm and 0.3 cm. The mean value of cutting edges is 0.3 cm. The majority of cutting edges exceeding 0.5 cm were shaped by striking two or more burin spalls.

8.7.2. Burin spalls

Thirty-six burin spalls, produced when dressing the cutting edge of burins, were found in the following distribution: 8 items in layer 1 and 28 in layer 2. All originate from angle burins. On 7 burin spalls previous cutting edges were documented, i.e. these spalls were merely traces of a rejuvenation of an already existing cutting edge on a burin. Two spalls removed the whole length of the burin edge, revealing two previously utilized cutting edges, one on each end of the flint. Six spalls documented their respective previous cutting edge as being variant b. The rest belong to variant a.

The relative frequency of burin spalls in relation to the documented number of cutting edges on burins is only 13%. The low ratio is due to two factors - the small size of the spalls and the difficulty of identifying them. In the flint material of Section B there are some 100 items which could be burin spalls. The above list includes only those examples that can be positively identified. The minute size of the spalls also influences how frequently they can be found. The length of those identified varies from 1.5 cm to 3.8 cm with a mean of 2.5 cm. If the length of the negatives on the burins is measured, about half of them are shorter than the above minimum value. Thus, a number of burin spalls, because of their minute size, must have been passed by unobserved during the investigation.

An attempt was made to divide the spalls according to whether they originate from burins fashioned from blades or bulbar flakes and flakes. Only 12 items (33%) were deemed to be struck from a blade edge. Consequently, the material shows an under-representation when compared with the degree of importance of blades as primary material in burin production. Fig. 55:2 illustrates the distribution in percentage of

the edge width of the burin spalls. It emerges that the edge width of the burin spalls is not in good correlation to the cutting-edge width of burins (Fig. 55:1). There is an over-representation of broader edges, in other words, of larger flints. The mean of edge widths is 0.4 cm.

The most generally accepted explanation of the burins' functional sphere is that their cutting edge, dressed by striking one or several spalls, was used for working hard materials, i.e. cutting a groove into them with the edge oriented perpendicular to the direction of the groove.⁵⁴ Once the groove was sufficiently deep, the material could be broken apart. Some objects from Section B exhibit traces of this procedure. The grooves of the slotted bone points were made in this way (Chapter 9.17). It is possible to document that these grooves were made by burins whose cutting edge was less than 0.2 cm wide. By studying the details of all slotted bone points existing in Sweden, the manufacturing process could be documented.⁵⁵ In the course of manufacturing, several burins were used, their width varying but never exceeding 0.3 cm. The cutting resulted in a groove with flat bottom and terraced walls. The deepest part of the groove was made with a cutting edge less than 0.1 cm wide. The walls were finally evened off with some cutting implement. The burin traces occurring on bone from the settlement layers of Ageröd I:HC vary in width from 0.1 cm to 0.3 cm.⁵⁶

Burins that have cutting edges wider than 0.5 cm were shaped by striking one or several burin spalls. The edge thus obtained will not be smooth and even. It could hardly have been used for cutting bone, but would be suitable for softer materials such as wood. When attempting to split bone and antler, a burin with a cutting edge which is wider than 0.5 cm would hardly serve the purpose. For one thing, considerable force must be used to cut a wide groove, and the amount of the material wasted would also be too large. When a cutting edge is shaped by striking two or more spalls, an angle burin is obtained which is suitable for working hard materials. The bottom of a groove cut with such a burin will be pointed in cross section. It may well be that the final smoothing of the grooves of the slotted bone points was done with this type of burin. The same result, namely a pointed groove, may be obtained if a burin whose cutting edge was shaped by one single stroke is held in such way that the cutting proceeds in the same direction as the angle of the edge. Bordes proposed another alternative function.⁵⁷ When burin spalls are detached, two rectangular edges will be formed on the negative. These, Bordes thinks, may have been used in the final smoothing of e.g. a bone point. A burin bearing traces of several spalls may possibly have been used in this manner.

23% of the burins have more than one cutting edge. The dressing of more than one cutting edge may be motivated either by the original cutting edge having turned dull, or by the first attempt to shape an edge being unsuccessful.⁵⁸ Another reason to dress more than one cutting edge on the same flint may be the need to use edges of varying widths alternatively.

All burin edges from layer 2 were studied thoroughly with the help of a stereomicroscope. 38% of the cutting edges were provided with wear traces along their entire length. 28% exhibited sporadically distributed retouch, and 34% of the burins had no retouch at all.

Based on the shortness of the burin facets, the above-mentioned function as opined by Bordes may be completely excluded in regard to the great majority of burins. Only 4% of all microscopically examined burins were deemed to exhibit traces of wear on one or both sides of their facets.

The bottom of most grooves cut in bone is not completely plane. Practical experiments made by the author found an explanation why the bottom is mostly convex. After pressing and pushing the burin against the surface to be worked some 20 times, splinters began to break from the cutting edge, thereby dulling it to a rounded shape hence forming the convex bottom of the groove. The author is convinced that any burin which has been used for a few minutes on bone should exhibit traces of this on its cutting edge. When working wood, the situation is quite different. A seasoned piece of pine was used in an experiment, and after moving the cutting edge of a burin 1000 times over a distance of a couple of centimetres on the wood, no edge damage whatsoever was documented, even though scanning was done at a high range of enlargement (60 x). In contrast, after some 300 strokes against bone, the cutting edge was completely unusable. The reason for this pronounced difference is probably not only the fact that the latter material is harder, but also that friction is greater and the flint thus will be heated. When flint is heated, it is brittler than usual and tends to splinter more.⁵⁹

8.8. Borers

Borers are another artefact category for which various primary artefact forms have been utilized. Three forms are given below, blades - type 1, micro-blades - type 2 and flakes - type 3 together with a distribution according to the shape of the points (Table XXIX). Thus, variant a represents borers whose two retouched sides converge evenly, while variant b borers have a marked division between the body and the beginning of the slender point. This classification disregards the extent of retouching which varies in

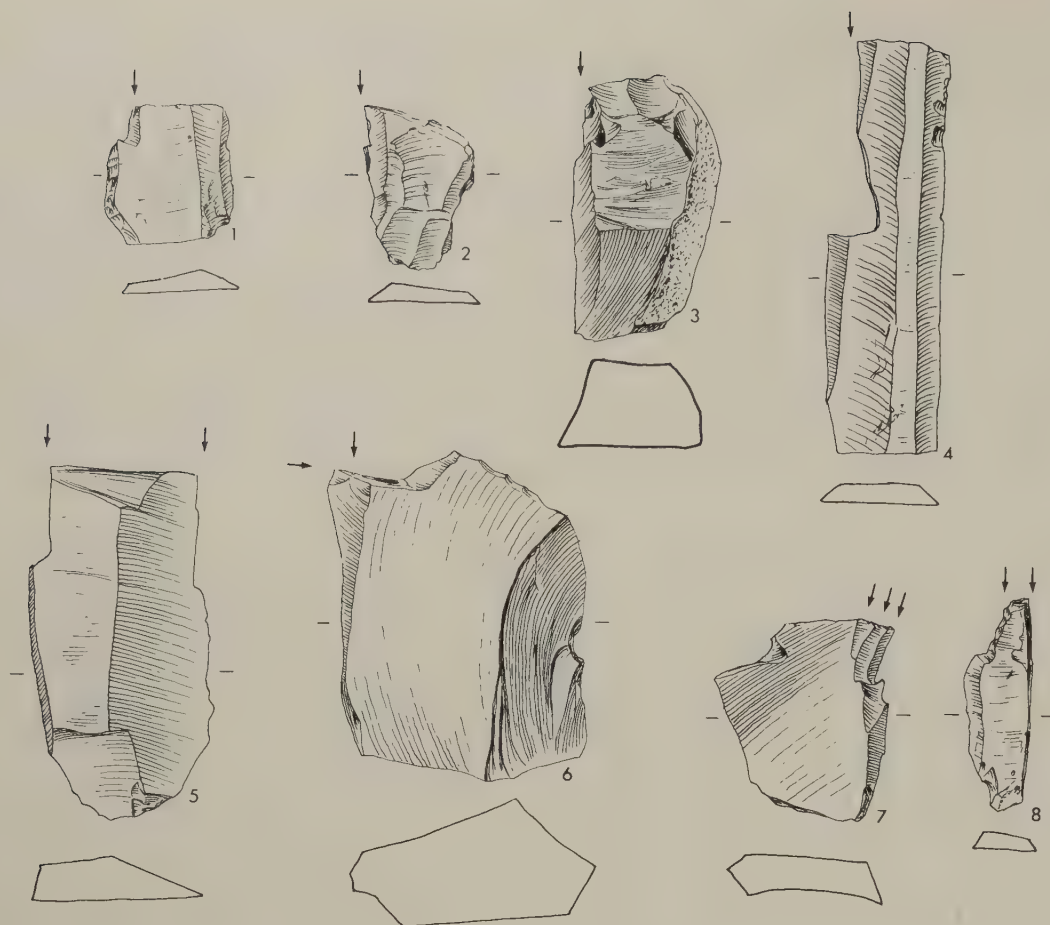


Fig. 56. Ageröd I:B. Burins (1-7) and burin spall (8). 1-4: type 2Ia, 5: type 2IIa, 6: type 2Ib, 7: type 2Id. 1:1.

both types.

Table XXIX. Ageröd I:B. Distribution in types and layers of borers.

Type	Layer			Σ
	1	2	3	
1 a	3	10	1	23
b	2	7		
2 a	6	22		39
b	2	9		
3 a	1	7		16
b	1	7		
Σ	15	62	1	78

Blade borers - type 1 - also includes borers made of blade fragments. The total will thus be 23 borers. Only 2 items were judged to be fragments, namely points broken off but having the proper blade proportions. The points of the borers are, except for 5, all dressed in the direction of the long axis of the implements. In 21 examples the points were trimmed by striking from the ventral side of the blade. The remaining two points were trimmed by strokes from two opposite directions, thereby giving the points a rhombic or trapezoid cross-section. Ten examples have retouch along the whole length of the borer.

Several borers exhibit clearly distinguishable traces of wear, namely negatives of small splinters. The tip of five points is broken off. The percussion bulb is preserved in five cases only, and on two examples the point was dressed from the bulb. In order to get an idea of how large a hole could be made with these borers, the width of the points, at 1 cm above the tip, was measured: max. 0.9 cm, min. 0.4 cm, the mean 0.6 cm.

There are only few references to the micro-blade borers - type 2 - in the subject literature.⁶⁰ They constitute the largest group - exactly one half of the total number of borers. Variant a has a large predominance. The set-off part of items of variant b does not exceed 0.5 cm. Nor are any of the micro-blade borers provided with retouch running the whole length of the flint. The width of the points, 0.3 cm above the tip is: max. 0.4 cm, min. 0.2 cm, the mean 0.3 cm. Thus, the micro-blade borers are complementary in size to the range of blade borers. On several micro-blade borers the traces of wear are so pronounced that it is impossible to distinguish them from possible primary retouch.

11 of the 16 flake borers - type 3 - exhibit a point oriented lengthwise. As in the case of blade borers, there are points both with triangular and rhombic cross-sections. In contrast to blade borers, the majority of flake borers, 14 items, are rhombic. Distinguishable traces of wear are infrequent, but the tip of two borers is broken off. One item is a double borer with two opposite points. The width of the points, measured 1 cm above the tip: max. 0.9 cm, min. 0.5 cm, the mean 0.7 cm. Flake borers, in other words, have somewhat stronger points than blade borers.

The difference in shape between variant a and variant b may probably be explained by the varying function they were intended for. A hole pierced by a borer of variant a will be conical, while variant b, since its point has practically parallel sides, will shape a hole with a straight profile. The majority of variant b borers, in contrast to variant a, have blunt tips. This must have caused difficulties when starting to bore a hole, particularly with hard materials. Variant a is definitely more suited for this purpose. In measuring the width of the two types, no difference was registered. The two types of borers may have been used in combination in the following way: the initial boring as well as the piercing of the material may have been done with variant a, whereafter variant b was used to shape a cylindrical hole.

Within Section B, boring may possibly be exemplified by the shaft-hole of the stone axe (Chapter 8.10.4). This hourglass-shaped shaft-hole may possibly have been made by the borers preserved on the site, although none of them shows strong enough damage, which would undeniably be the consequence of contact with the hard sandstone.⁶¹ A hard wood or bone point would serve the purpose better, since such tools, in combination with sand as an abrasive, are able to perforate even the hardest stone.⁶² Most likely, however, the shaft-hole was made by hammering a pointed stone - a method which has ethnographically documented parallels.⁶³

The only kind of proof exemplifying how the large number of micro-blade borers documented in the Ageröd finds were used are a number of perforated teeth from Section HC.⁶⁴ Another function in South Scandinavia from the age in question is the technique of decorating bone or antler by boring shallow pits.⁶⁵

8.9. Rectangular artefacts

Becker, in his work on settlement material of the Maglemose Culture on Bornholm, distinguishes a type of artefact which he calls rectangular knives.⁶⁶ He describes them as being quadrangular or rectangular fragments of blades. Strong frictional retouch is visible along one or both sides of the cutting edge. This frictional retouch is mostly strongest at one of the corners. Althin likewise separated a flint type which he calls rectangular blade fragment, but does not mention the principle guiding his selection.⁶⁷

When the flint material excavated in the 1970s was examined, all flints corresponding to the definition of blade fragments were sorted out for a close inspection. The reason was that Becker thought the similarity of these rectangular knives could not possibly be the result of random use of broken blades. Of the blade fragments found in Section B, 1107 items had traces of frictional retouch. The occurrence of frictional retouch alone can hardly motivate a separation of an individual artefact type. To distinguish the type from the large number of flints bearing frictional retouch, it must fulfill the requirements of certain criteria. The first of these is the particular primary material, namely blade fragments. Then, in order to avoid taking these for fragments of other implements, for instance a type of knife exposed to unusually forceful pressure, the position of the frictional retouch on the artefact will be the second criterion. Thus, frictional retouch should occur on at least two diagonally opposed corners. 226 items out of the total of blade fragments having frictional retouch fulfill both these requirements. This group, here called rectangular artefacts, can now, according to the number of retouched corners and sides, be subdivided as in table XXX.



Fig. 57. Ageröd I:B. Borers (1-5) and rectangular artefacts (6-8). 1: type 3b, 2: type 3a, 3: type 2b, 4: type 2a and 5: type 1a. 1:1.

Table XXX. Ageröd I:B. Distribution in layers and variants of rectangular artefacts.

Layer	Number of retouched corners									Σ
	1	2	3	1	2	3	1	2	3	
One side retouched	10	7	-	-	-	-	-	-	-	17
Two sides retouched	12	65	2	14	28	2	-	-	-	123
Three sides retouched	1	5	-	15	18	-	1	7	-	47
Four sides retouched	-	-	-	2	15	-	3	19	-	39
Σ	23	77	2	31	61	2	4	26	-	226

It can be seen that as the number of retouched corners increases, so does the number of retouched sides. On all examples, a retouched corner is always connected with a retouched side. 92% of the rectangular artefacts are retouched on two or more sides. The various types of retouch were distinguished and recorded appropriately (See List of definition and chapter 8.13). It emerges that deliberate retouch - A and B - occurs exclusively on 3%, a combination of deliberate/frictional retouch on 7%, while the remaining 90% have frictional retouch - D and E - only. Adding up all retouched sides of the artefact group results in 560 sides, the various types of retouch distributed as follows: A: 2%, B: 3%, D: 36% and E: 59%. This shows a clear predominance of type E - cutting - retouch. If, on the other hand, the E retouch of the rectangular artefacts is compared with the occurrence of the same retouch type on, e.g. blades, a certain difference is noticeable which, however, is difficult to register objectively (Chapter 8.13.4). The retouch on the rectangular artefacts is considerably stronger. In addition, the negatives reach higher up, seen from the edge, a fact which probably means that the edge was under hard pressure. All recorded edge corners show this special form of E retouch, meaning that at least as much pressure was applied to the corners as to the sides.

One interesting subgroup of rectangular artefacts consists of a combined artefact where one of the corners was trimmed into a burin edge. The subgroup includes 25 items; 5 in layer 1, 19 in layer 2 and 1 in layer 3, and is recorded in the number of the burins proper (Chapter 8.7). Still, it should be regarded as a special subgroup since it satisfies the requirements of the definition of rectangular artefacts. According to the burin typology, these combination tools all belong to subgroup 2 Ia. The trimmed burin edge is narrow, very seldom exceeding 0.2 cm.

The edges of rectangular artefacts display traces of extremely intensive wear. The predominance of E retouch indicates that the flints were in fact used as a kind of knife. Judging by the large number of detached spalls, the implements were used for cutting hard materials such as antler or bone, a hypothesis finding support in the fairly frequently occurring combination with a burin edge.

8.10. Axes and sharpening flakes

Core and flake axes used to be classified in early research according to two criteria, namely dressing technique and morphology. Welinder believes a classification based on the dressing technique to be the most objective method and therefore bases his own typology - like Althin and Brinch Petersen - on the system of Troels-Smith.⁶⁸ They all apply certain modifications; Brinch Petersen simplifies, while Althin and Welinder amplify the original system. A group of archaeologists in Gothenburg have carried out an in-depth analysis of a large number of elements.⁶⁹ Here, the system of Welinder will be applied with one minor change. Krämer, in his treatment of the settlement site of Elinelund, dealt thoroughly with the prerequisites of a verbal definition of the axe types Welinder has treated.⁷⁰ Welinder uses the form code for cutting edges, applied by Troels-Smith to type 1 axes, for all core axe types (See List of definitions). The system is amplified moreover by two new types, - type 5, representing axes manufactured in unclassifiable techniques and type 6, comprising pick axes. The typology used here is based entirely on the mode of dressing and the particular shaping of the cutting edge that can be registered. That the system has some shortcomings in regard to clear definitions is exemplified by the axes from Vinde-Helsingø which are classified differently by Troels-Smith and Brinch Petersen respectively.⁷¹

The modification applied by the author consists of the addition of a particular variant O among the cutting edge forms, designating a cutting edge bearing on one side traces of trimming for sharpening a previous, dulled cutting edge. The classification of flake axes follows a system which utilizes both Troels-Smith's and Mathiassen's experiences.⁷²

21 flint axes were found in Section B. Of these, 19 are core axes (90%), and 2 (10%) are flake axes.

8.10.1. Core axes

Twelve core axes are intact examples, while 5 others are fragmentary but have their cutting edge preserved, so that its orientation in relation to the body of the axe can be stated (Table XXXI).

Table XXXI. Agerød I:B. Distribution in types and layers of core axes.

Type	Shaping of cutting	Layer		Σ
		1	2	
1	a0	-	1	1
	b1	-	1	1
	-	-	2	2
2	a	-	1	1
	a0	-	1	1
	b1	-	1	1
3	-	-	1	1
4	a	-	3	3
	a0	1	-	1
	b2	-	2	2
	-	-	1	1
5		1	1	2
6		-	2	2
Σ		2	17	19

The variant in axe types is considerable, with an obvious predominance of type 1. The axe of type 4b1 is provided with two cutting edges trimmed alike. Seven out of the 19 core axes had some kind of secondary trimming of the cutting edge - 5 of the 7 trimmed by percussion at right angles to the long axis of the artefact.

The butt end of one of the core axes exhibits an oblong platform, from which at least two micro-blades were detached. As in the case of the handle cores, one platform edge is retouched. The trimming gives no indication which was the primary form of the flint - core axe or handle core. The axe in question is the largest among the core axes. That core axes may be manufactured from handle cores has been suggested by Bille Henriksen.⁷³ But the position of the negative working face on the axe in question is such as to rule out traces of a secondarily trimmed handle core. Nor are there any axes, triangular in cross-

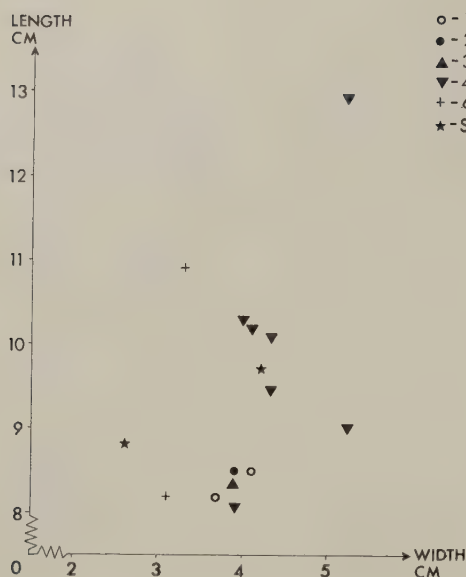


Fig. 58. Ageröd I:B. Length-width correlation of core axes (1-6) and flake axes (S).

section, where one side would be the remains of the handle core's platform. Two core axes were fashioned from blade cores.

The variation in length and width is illustrated in fig. 58. The mean values are 9.6 cm and 4.0 cm respectively. Five of the core axes that could be measured are more than 10 cm long. Axes of type 6, i.e. pick axes, are narrower than the rest.

Most axes have almost parallel edges, giving them an even width, save one single example with markedly triangular shape, its maximum width at the cutting edge. It also emerges from fig. 58 that there is no unambiguous correlation existing between length and width, the one increasing with the other. The mean in the correlation L/W is 1.6, the variation 2.0-1.3.

8.10.2. Flake axes

According to Welinder's classification of flake axes, two axes from layer 2 belong to this main type. The two axes, both of type 1a, i.e., having their side edge trimmed from the ventral face, show the proportions according to table XXXII.

Table XXXII. Ageröd I:B. Length (L), length/height (L/H) and edge width to the width at a point a third of the length from the butt (W/w).

L cm	L/H	W/w
9.7	4.2	1.2
8.8	4.6	0.7

The correlation of length and width of flake axes may be seen in fig. 58. The low value of W/w illustrates that the axe body is relatively even in width and not of the classical triangular flake axe type. The morphological differences between core and flake axes are minor. In spite of different primary materials, the end product will be the same.

8.10.3. Sharpening flakes

Eleven flints were deemed to be manufacture debris, namely sharpening flakes. Two came from layer 1, the others from layer 2. One such flake was definitely detached from a flake axe. Prior to the flaking, the cutting edge of the core axes had had the following trimming: a:7, b1:2, and b2: 1. Thus, the majority had not been trimmed in any specialized way. The sharpening flakes were detached in two different ways, either struck perpendicularly to the long axis (8 items) or in the same plane as the long axis (3 items). A survey of the cutting-edge shape prior to secondary trimming and the orientation of the per-

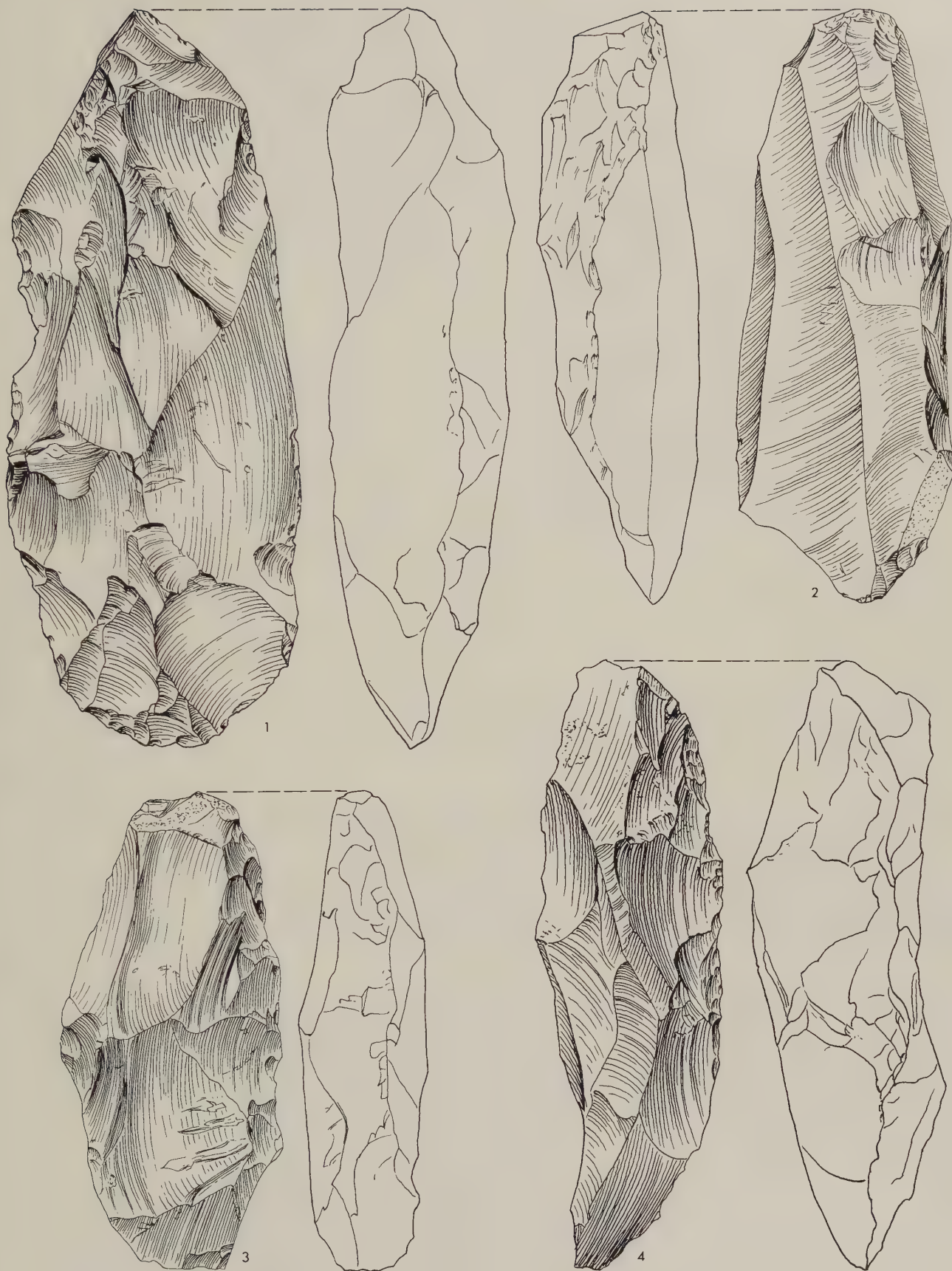


Fig. 59. Ageröd I:B. Core axes. 1: type 2b1, 2: type 1-, 3: type 2a0 and 4: type 6. 1:1.

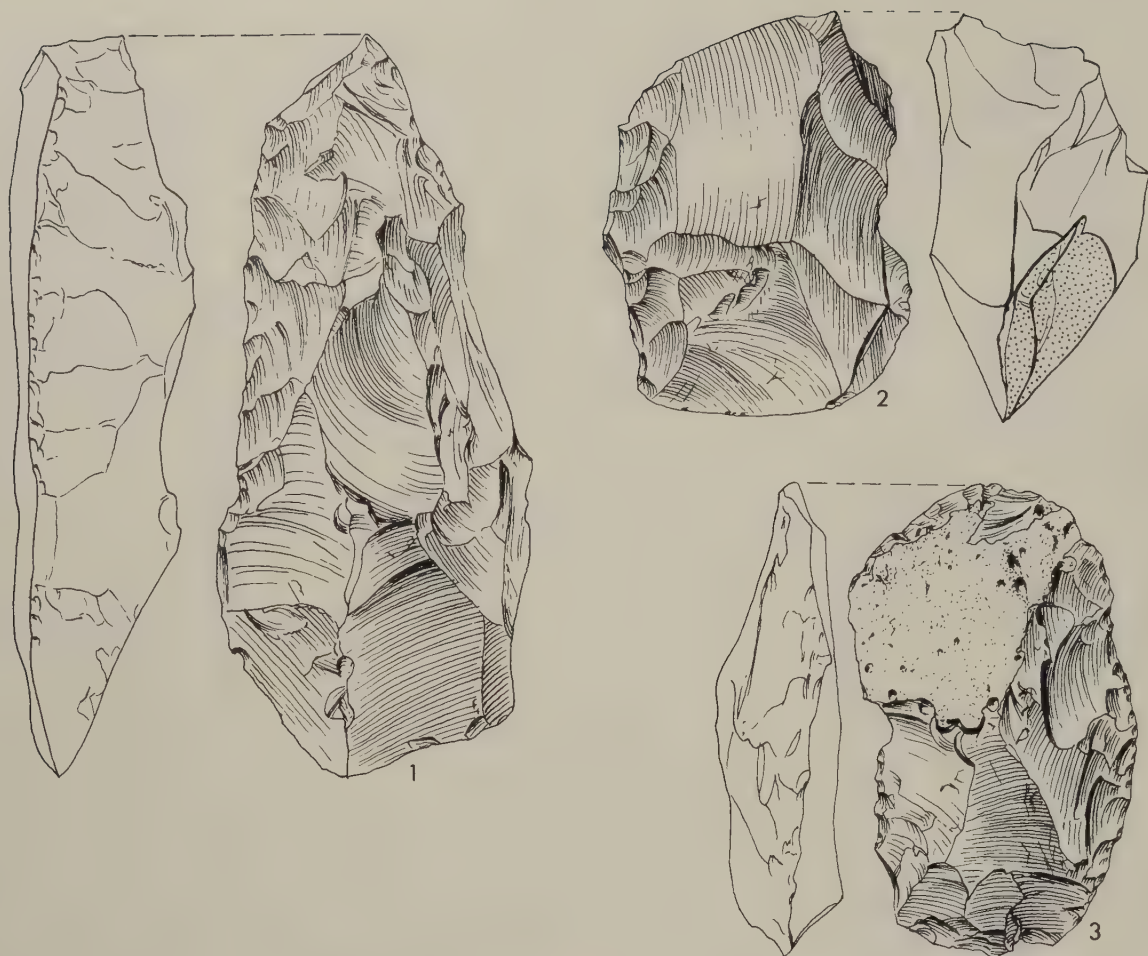


Fig. 60. Ageröd I:B. Flake axe (1), fragmentary core axe with sharpening flake (2) and sharpening flake (3). 1:1.

cussion as related to the long axis of the axe was conducted. The result showed that 3 axes previously not having specialized cutting edges have, by a single sharpening stroke, received one.

The variation range of the cutting edge of sharpening flakes is 2.4 cm – 4.0 cm, the mean 2.7 cm to be correlated with the cutting edge variation in width of the core axes, 2.4 cm – 4.0 cm with a mean of 3.1 cm. The width of the sharpening flakes lies well within that which can be ascertained on the preserved axes. In one case only could the sharpening flake, because of the special kind of wear traces, be combined with the parent axe.

Through finds both in Denmark and in North Germany we know how core axes have been shafted.⁷⁴ In all find complexes, the axe was fitted in an antler socket, which in turn was provided with a shaft-hole. This method offered several advantages. The piece of flint used for the purpose did not have to have too large proportions in order to be able to function as an implement. The twofold elasticity of shaft and socket lessened the danger of too much pressure being exercised on the flint axe, thus avoiding its splitting. There are some examples illustrating that sockets for axes have been used during the period of the axes described above (Chapter 8.15).

Six of the core axes from Section B exhibit wear traces on their cutting edge part – in the form of striation on the surface of 4 out of the 6. The two remaining axes also have polish of wear in addition to striae. Gramsch has shown that, by studying the traces of wear, he would be able to distinguish whether a flint was hafted as an axe or an adze.⁷⁵ The striae are the result of repeated strokes, whereby small particules of the cutting edge break off, and these particles scratch the surface in continued striking. If the striae run at right angles to the cutting edge, they indicate an adze, while the striation on an axe runs obliquely from the cutting edge. Accepting this as a valid distinction for classification, in our case, three of the items would qualify as axes and the other three as adzes. If, on the other hand, the shape were considered the decisive factor, then four would seem to be axes, and two adzes. However, in consideration that a socket might have been used, the question of shape becomes less important.

Two of the examples deemed to be adzes by their traces of wear exhibit polish of wear on their cutting

edge. Both also show that they were resharpened after the polish of wear came into existence. On one of the two examples just a minor part of one side of the cutting edge has polish of wear, while on the other it covers the whole length of one of the cutting edges. On this same example it is also noticeable that the opposite, resharpened cutting edge has a much less pronounced polish of wear. This kind of wear traces is not to be found on any other flint in Section B. It is mainly known from Neolithic flint artefacts, for instance flint sickles, which had repeated contact with siliceous blades of grass.⁷⁶ Similar polish may result from long use on soft materials such as skin or hide too.⁷⁷

On three flakes originating from cutting edges, the edge itself clearly shows striation. Judging by the orientation of the striae in relation to the cutting edge, two of the flakes belonged to adzes and the third was hafted as an axe. The latter also shows some slight polish of wear on some parts. Since it occurs on one side only, this probably means that the cutting edge had been resharpened previously.

8.10.4. Stone axes

The eight stone axes from Section B constitute, in regard to shape, raw material and dressing, a heterogeneous group. Three items may be termed oval pecked axes according to the proportional morphems defined in Welinder's treatment of the same axe type:⁷⁸

- No. 1. Oval pecked axe of diorite, found in layer 2.⁷⁹ No traces of secondary trimming. Only one third of the axe, the part closest to the cutting edge, was ground, while the rest of the surface was battered to an even surface. The cutting edge was ground in several stages without any final uniform trimming, so that the cutting edge exhibits a number of facets.
- No. 2. Oval pecked axe of diorite, found in layer 1. As on the above item, no traces of secondary trimming. The grinding on this axe covers about half of the surface. The part not ground is more uneven in structure than is the case with axe no. 1.
- No. 3. In the refuse section of layer 2, a strongly weathered oval pecked axe of diabase was excavated. In constructing a transect through the surrounding peat, it could be ascertained that the weathered stone originally was a oval pecked axe. Like axe no. 1, its cutting edge was not quite in the mid-axis.

Table XXXIII. Ageröd I:B. Length (L), width (W), distance from the edge to the broadest cross-section (D), thickness (T), width of the axe at a point a sixth of the length from the butt (Bbutt) and thickness/width maximum of stone axes.

Axe no.	L cm	W cm	D cm	T cm	Bbutt	T/W max
1	14.3	5.2	1.8	4.0	2.9	80
2	14.0	5.3	1.5	3.6	3.8	68
3	13.5	5.0	2.0	4.0	3.0	80
4	11.2	4.4	0.7	2.4	2.4	

Because of the strongly weathered state of axe no. 3, the measurements in table XXXIII should be considered with some caution. In spite of this reservation, however, the three oval pecked axes have relatively similar proportions.

Three of the stone axes form a special group - they all were shaped mainly by trimming. Both the shape and the manufacturing technique remind of the Late Mesolithic Limhamn axes.⁸⁰

- No. 4. Axe of slate from layer 2 (Fig. 61:1). One third of the axe, the part closest to the cutting edge, is ground on all surfaces, while the rest of the axe is ground on the sides only. One edge bears marks of battering. Grinding, however, has not entirely removed the most pronounced negatives. The original cutting edge is now rounded through vigorous use. The cutting edge formed a prolongation of one of the sides of the axe.
- No. 5. Fragmentary axe of slate, found in layer 2 (Fig. 61:3). Only the cutting edge is preserved. This part was ground similarly to axe no. 4. The length is 5.7 cm, the width 3.9 cm. The cutting edge was exposed to vigorous use, whereby spalls were detached from both sides. The cutting edge appears to have been in the same plane as one of the sides of the axe.
- No. 6. Fragmentary axe of altered basalt from layer 2, the cutting edge part preserved. The length is 7.0 cm, the width 3.9 cm. The cutting edge, which formed a prolongation of one of the sides, exhibits no traces of wear. The ground surface next to the cutting edge consists of a number of facets.

Since only one example in this group is intact, it is impossible to evaluate whether the manufacturing technique is the only similarity between the three items. All three axes have asymmetrically placed

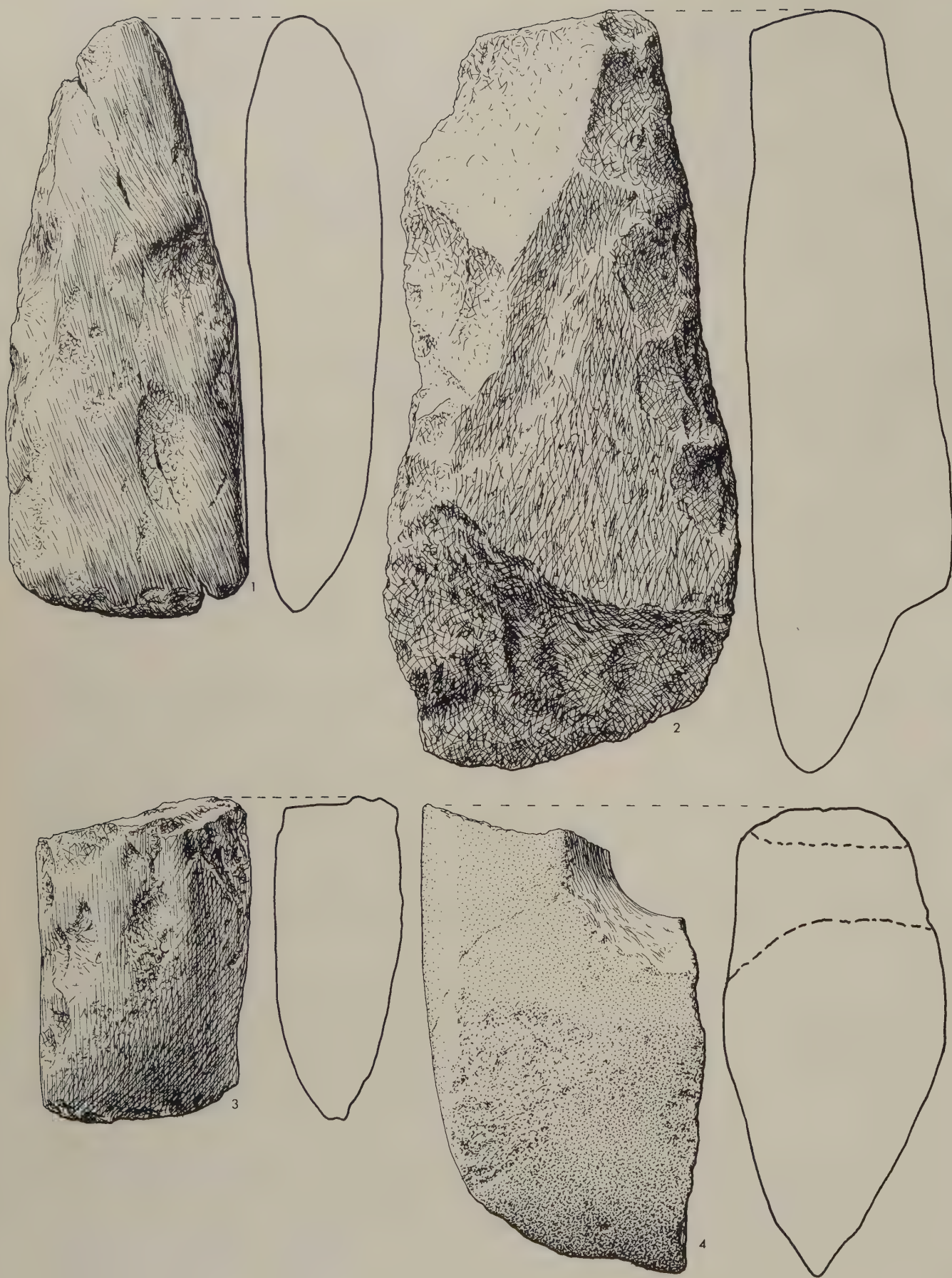


Fig. 61. Ageröd I:B. Stone axes. 1: axe no. 4, 2: semi-finished axe, 3: axe no. 5 and 4: axe no. 7. 1:1.



Fig. 62. Ageröd I:B. Stone axe no. 1 and its traces of wear as striae. Above: 1:1, below: 6X.

cutting edges and the axe body is ground in the same technique. Two of the axes are also made of the same material, slate. They are also pointed-oval in cross-section. The proportions were probably similar in the group as a whole, corresponding to those shown by axe no. 4.

No. 7. A fragment of an implement with shaft-hole, made of sandstone and found in layer 2, may also be classed in the group of stone axes (Fig. 61:4). The fragment forms a 1/4 sector of the shaft-hole and a half of the original cutting edge. The length of the preserved part is 8.1 cm and its width 4.9 cm, indicating that the original width would have been about 10 cm. The thickness is 3.6 cm. The cross-section of the axe immediately below the shaft-hole was oval with slightly indicated edges. All of the preserved surface is ground. The shaft-hole, originally hourglass-shaped, had an outer diameter measuring ca 3.0 cm and a minimum diameter at its narrowest point of ca 1.5 cm. The cutting edge which shows traces of wear, was in the same plane as the mid-axis.

Another object of diabase from layer 2, having a strongly weathered surface, ought also be classed with the stone artefacts. The object is pointed-oval in cross-section, its width measures 4.2 cm and its thickness 3.4 cm. The maximum width is reached at one end which is truncated. The opposite end tapers and is rounded off - this was originally the butt.

The presence of a semi-finished artefact of diorite from layer 2 indicates that the stone axes were made at the site (Fig. 61:2). The rough-out consists of an oblong piece of raw material having two parallel sides with four working faces. The length is 13.8 cm, the width 6.5 cm and the thickness 3.8 cm. The item was probably intended finally to become an axe similar in shape to axes 4-6.

Four stone axes bear traces of wear. On the oval pecked axe no. 1, next to the mid-facet of the cutting edge, there are several striae of a maximal length of a couple of centimetres, which run at right angles to the cutting edge (Fig. 62). The orientation of the wear traces in relation to the cutting edge indicates that the artefact was shafted with the cutting edge at right angles to the shaft. This is an interesting point, since there are no other indications that the object is an adze.

Axes no. 4 and 5 exhibit strongly pronounced traces of wear - a fact which is not too surprising if we consider the soft raw material they were made of. The position of the cutting edge indicates that these items were used as adzes. Also, on both, that side of the asymmetrical axe which turns into the cutting edge was worn most. On the other hand, there are no other traces of wear such as striae on the two axes. The sandstone axe with shaft-hole shows a few spall negatives which may possibly be connected with wear.

That stone axes are well suited for working wood is documented even in modern times. Until the 1960s, people of the Dugum-Dani Culture in the highlands of New Guinea were using both stone axes and stone adzes resembling the oval pecked axes treated here.⁸¹ With an axe of this kind, a tree measuring 22 cm in diameter was felled with no particular effort in five minutes.

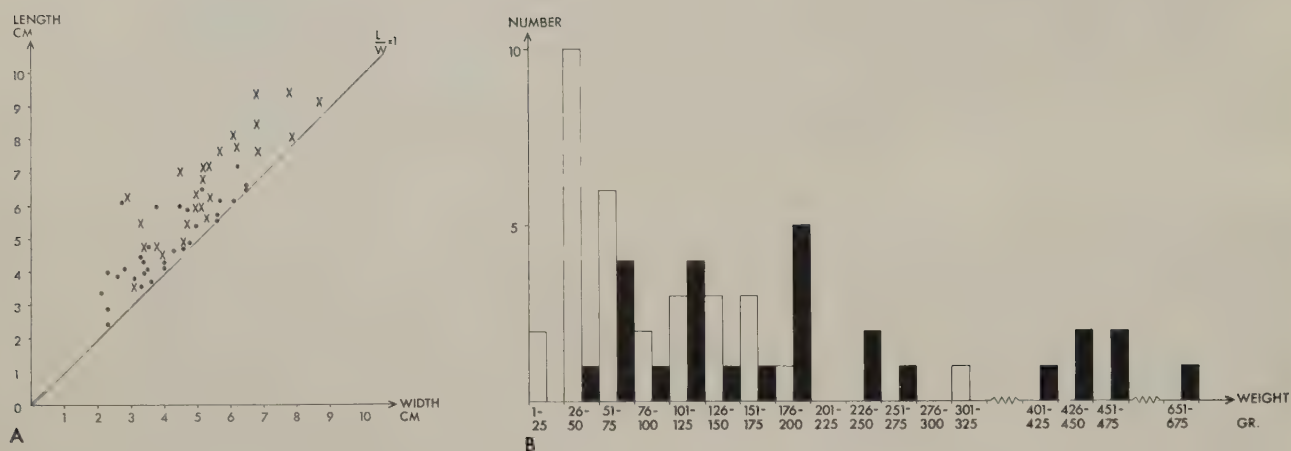


Fig. 63. Ageröd I:B. Length-width correlation (A) and weight (B) of hammerstones. Dots and open bars: hammerstones made of flint; crosses and hatched bars: hammerstones made of stone.

8.11. Hammerstones

Hammerstones are flints or stones that have obviously battered areas, regardless of what function they have been used for primarily.

Table XXXIV. Ageröd I:B. Distribution in layers and materials of hammerstones.

Layer	Stone		Flint		Σ
	whole	fragmentary	whole	fragmentary	
1	2	-	6	6	14
2	24	3	25	24	76
3	-	-	1	-	1
Σ	26	3	32	30	91

While the difference in the number of completely preserved stone and flint items respectively is relatively little, it is remarkably pronounced between the two kinds of fragmentary items (Table XXXIV). This circumstance is probably caused by the difficulty of identifying the latter category. On the fine grained flint even small battering marks can easily be identified, but on stone it is much harder. More than one third of the hammerstones of stone had areas affected by weathering.

Measurements taken of the maximal lengths and widths respectively indicated a spherical shape for the majority of hammerstones, particularly among those of flint. Fig. 63:1 also illustrates that the stone examples are somewhat larger. But these measurements could be misleading, since very few of the hammerstones have an even surface. Therefore, the weights of the hammerstones offer a suitable medium for comparison. The hammerstones were divided into two groups (Fig. 63:2). The larger group, with a variation in weight ranging from 20 g to 275 g, encompasses hammerstones of both flint and stone. The smaller group, consisting solely of items of stone shows a variation in weight from 400 g to 670 g. The mean weight of examples of flint is 83 g, while that of the stone items is 351 g.

The name of the artefacts - as is the case with most of the artefact groups - indicates their function. However, through practical experiments and microanalysis it has been possible to show that the functional aspect of this artefact group is not necessarily entirely one-sided. In an attempt to classify the hammerstones, they were divided according to the number of battered areas (Table XXXV). It has to be noted that while all complete flint hammerstones could be classified, nine stone examples had to be left out of the table because they exhibited too badly weathered surfaces. In spite of this, the percentage relations between flint and stone hammerstones are widely varied. One possible reason for this is that flint hammerstones were used directly for striking. Those of stone were used to a higher degree in applying so-called indirect percussion, a process in which an antler or bone punch was interposed between the striking implement and the core, resulting in two battered areas on opposite sides of the hammerstones.



Fig. 64. Ageröd I:B. Hammerstones made of stone (1-2) and of flint (3). 1.1

Table XXXV. Ageröd I:B. Shapes of battered areas on hammerstones.

	Flint %	Stone %
Contiguous battered surface	20	13
Three battered areas	67	19
Two battered areas on opposite sides	10	63
One battered area	3	5

A few well-presevered hammerstones exhibit a very finely and evenly battered area. They have certain affinities with the artefact group called "retoucheurs", i.e., objects of bone or stone which were used in retouching flint artefacts.⁸² Another functional sphere is that of battering tool in the preparation of stone axes.⁸³ The primary function of several flint examples was not that of hammerstone, as illustrated by 18 items which obviously had been blade and flake cores prior to being used as hammerstones. One hammerstone is provided with parallel strokes on two opposite areas. They are the result of cutting with an edge made of hard material (Fig. 64:1).

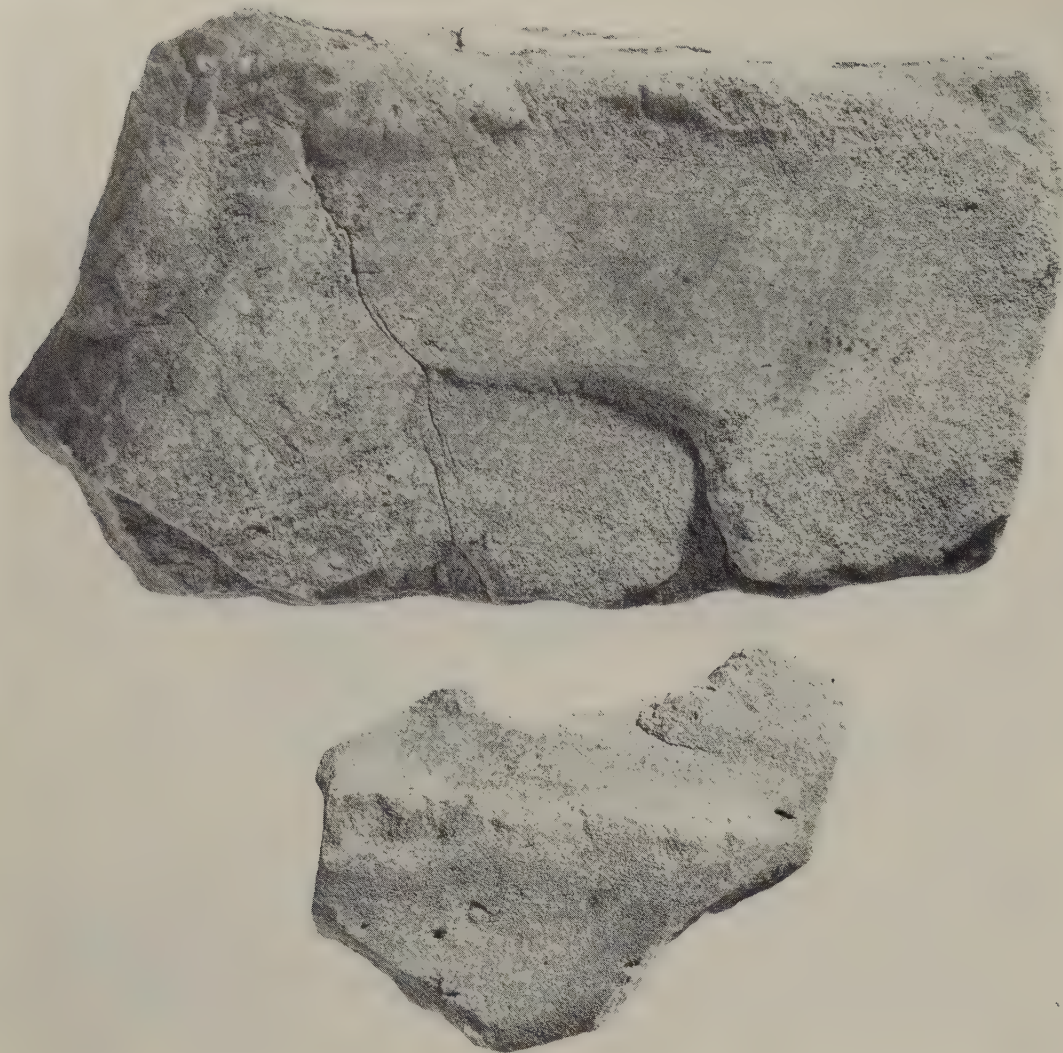


Fig. 65. Ageröd I:B. Grindstones. 1:2.

8.12. Grindstones

Forty grindstones, complete or fragmentary, were found in Section B. Of these, 32 originate from layer 2, while the rest come from layer 1. Only 10 grindstones can be said to be intact, while the others are fragments with preserved grinding surfaces ranging in size from 5 cm^2 to 330 cm^2 . Among the intact grinding stones, the size of grinding surfaces varies from 55 cm^2 to 460 cm^2 .

The items have various shapes; some have planar sides and are quadrangular in cross-section, others are asymmetrical in cross-section and have several grinding surfaces. Two of the grindstones are provided with several grinding surfaces placed asymmetrically, while 9 items have two grinding surfaces on opposite sides and the rest have one grinding surface only. The grinding surfaces may be quite different in texture and other features. On seven grindstones, merely the uppermost areas of an uneven surface are ground down, while 12 examples have a contiguous, even and plane surface. The rest exhibit more or less concave grinding surfaces. In spite of the fact that several of the grinding stones are weathered, those which have a coarse textured surface may easily be distinguished from those having fine texture. The two kinds of texture are both present on the same grindstone in two cases. The difference in texture cannot be explained by the degree of wear - there are examples, where the grinding area is strongly concave, thus indicating heavy use, but still very smooth. The difference, then, should rather find its explanation in different functions. Artefact categories exhibiting traces of grinding are first of all stone axes, but possibly also some of the bone artefacts. Some of the former show that their cutting edge has been ground in various stages (Fig. 62). For such procedure, a plane surface was well suited. Other items of the same category were ground to round off the edges, for which purpose a concave grinding surface was necessary. One grindstone, for instance, has four different concave grinding surfaces of various widths, ranging from 1.8 cm to 4.6 cm.

Only one grindstone - which it was possible to fit together from several pieces - exhibits traces of grinding a slender point, in the shape of a 0.2 cm wide groove in an otherwise flat, ground surface. The position of the narrow groove shows that it was made first after the stone had been demolished.

Except for two examples of quartzite, the grindstones are all made of sandstone. In spite of the mostly

soft material, the larger grindstones exhibit fresh fractures. In other words, they are not pebbles or boulders of sandstone incorporated in the morain and selected because of their suitable shape, but pieces deliberately detached from larger blocks.

8.13. Retouched flakes and blades

A considerably large number of bulbar flakes and flakes with smaller or larger retouched areas cannot be classed into any of the artefact categories distinguished on morphological grounds. Except for a few studies, the former group has never been extensively and systematically classified. Such flints are usually grouped only according to whether their retouching may be considered deliberately done or seems to be frictional retouch caused by wear. But, even though bulbar flakes and flakes attract so little interest, they actually constitute a very important group of artefacts. Their frequently asymmetrical shaping, both as regards morphology and the position and shape of retouch, makes a detailed survey difficult. The first condition for any such undertaking would be the creation of clear definitions for differentiating the various aspects of the many-sided term "retouch".

There are a few examples of attempts to describe retouch in archaeological literature. But these attempts are usually restricted to the kind of retouch intentionally made in order to alter the shape of the artefact – usually called deliberate retouch.⁸⁴ Tixier, for instance, differentiated seven different kinds of deliberate retouch according to their relative size. The mutual relation in size of the individual scars and the direction of the strokes was considered too. The author, however, considers that it would be altogether too difficult to differentiate the boundary lines separating the various forms of deliberate retouch on truly objective grounds. Therefore, deliberate retouch is here defined as a continuous row of negative scars whose relative length, measured at right angles from the cutting edge, should not deviate more than 25% from the length of the longest scar. Any retouch not satisfying these conditions is called frictional retouch.

Deliberate retouch is divided into three groups according to maximum length: A $\geq$ 3 mm, B < 3 mm $\geq$ 1 mm and C < 1 mm. The first group originates from Malmer's definition of flake scrapers.⁸⁵ The two others appeared to have a different enough distribution to justify a separation into two distinct groups.

Flints provided with frictional retouch occupy a special position among artefacts. The effect which can be observed on the artefacts was not achieved intentionally, but was effected by the regular use of the artefacts. Implements with deliberate retouch have chiefly morphological and thus typological importance, while artefacts exhibiting frictional retouch play an important role in leading us towards a more thorough knowledge of the function these artefacts had.

Studies of societies that still use stone artefacts show that both deliberately retouched artefacts and such without are used.⁸⁶ Unretouched artefacts are sometimes just as good or even better than retouched ones – for instance for working wood.⁸⁷

In the case of certain artefacts, information obtained from the combination of deliberate and frictional retouch may give a very valuable overall view. The term frictional retouch is frequently applied to retouch which is asymmetrical both in regard to size and placement of the scars. If a classification of frictional retouch is to be made, it is thus important that one should have experience in the interpretation of various kinds of scars. Frictional retouch has been studied by several scholars, mostly in connection with the reconstruction of various activities, so that results of modern experiments could be compared with prehistoric material.⁸⁸ Experiences from these investigations are not entirely unambiguous. Nonetheless, certain conclusions, accepted by most scholars, may be drawn. The direction of the pressure against the thin edge plays an important role in how the spalls will be removed. When a piece of flint is used for scraping, this will result in very small spalls being removed from only one side of the cutting edge, namely the side away from the material to be scraped (Fig. 66:D). "Scraping" means here an action in which the tool is moved in one direction only, namely at right angles to the cutting edge. If, on the other hand, a tool is used for cutting, the motion is carried out in the plane of the cutting edge. In this latter case, pressure will be applied with the same force to both sides of the cutting edge and therefore spalls will be detached from both sides (Fig. 66:5).⁸⁹ In classifying frictional retouch, only these two types may be considered sufficiently easily identifiable. This relatively rough separation causes problems in those cases where one and the same cutting edge was used alternately for both actions. In such cases, the retouch will be classed as originating from a cutting motion. However, much too little is known so far about the real meaning of scars. Moreover, only in a very few cases have other kinds of traces of wear, for example striations or wear polish, been identified. They might give further information about function. In order to see whether there are other differences separating bulbar flakes and flakes with deliberate and/or frictional retouch, not only the nature of the retouch but also its extent along the cutting edge was taken into consideration, differentiating whether frictional retouch stretches over more than 50% or less than that of the overall length of the cutting edge.

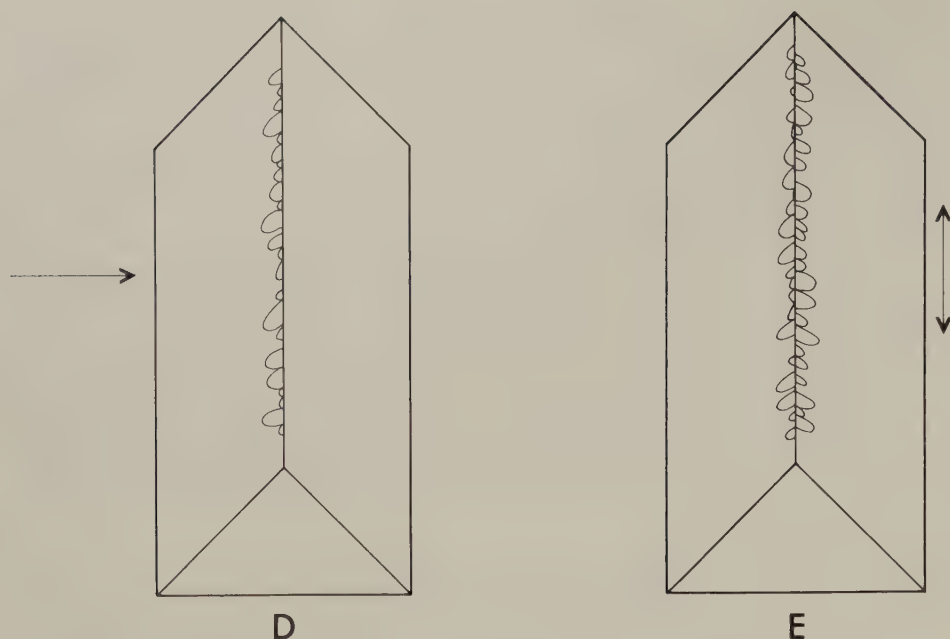


Fig. 66. Position of retouch by scraping (D) and retouch by cutting (E). The arrows show the motion of the tool.

8.13.1. Retouched bulbar flakes

An attempt was made to group retouched bulbar flakes according to the relation of the retouch to the bulb when the latter is held facing the viewer and turned down. 420 bulbar flakes were defined as retouched but impossible to classify morphologically within already established artefact types. Of these 71 originate from layer 1, 344 from layer 2 and 5 from layer 3. This constitutes about 1% of all bulbar flakes – a small percentage compared to Althin's 5%.⁹⁰ The difference may be explained by the fact that only definitely identifiable retouch types were counted.

155 bulbar flakes, or 37%, show frictional retouch on both sides of the cutting edge. They are grouped as follows:⁹¹

- I: both edges retouched along more than 50% of the length.
- II: both edges retouched along less than 50% of the length.
- III: the left edge retouched along more than 50%, the right edge along less than 50% of their respective length.
- IV: the left edge retouched less than 50%, the right edge more than 50%.

This classification tries to establish a system in the relation between extent and position of the retouch.

Table XXXVI. Ageröd I:B. Position and types of retouch on bulbar flakes with retouch on both sides.

Position of retouch	Type of retouch											Σ
	AA	AB	AC	BB	BC	BD	BE	CD	DD	DE	EE	
I				14	1	8			36	10	6	75
II	2	6	1	14	1	8	2	1	15	5	2	57
III				3		5		2	4	1		15
IV				1					2	2	3	8
Σ	2	6	1	32	2	21	2	3	57	18	11	155

Table XXXVI shows the dominance of variant I, followed by variant II, while variant III and IV have a considerably lower frequency. 28% have various forms of combinations of deliberate retouch. 17% exhibit both deliberate and frictional retouch, while 55% have frictional retouch. Among the types of deliberate retouch, type B is predominant. The low frequency of type A is caused by the fact that a very considerable amount of bulbar flakes with A retouch have been classed with the group flake scrapers (Chapter 8.5). The most frequently occurring combination of types of retouch is DD, occurring on more than one third of bulbar flakes. The D type occurs in various forms on 64% of the bulbar flakes retouched on both edges.

The remaining 265 bulbar flakes have only one cutting edge retouched. In classifying them the same roman numerals I and II are used with the understanding that only one cutting edge is meant. There is, however, a differentiation between retouch on the left side (L), or on the right (R).

Table XXXVII. Ageröd I:B. Position and types of retouch on bulbar flakes with retouch on one side.

Position of retouch	Type of retouch						Σ	Position of retouch	Type of retouch						Σ
	I	A	B	C	D	E			II	A	B	C	D	E	
L			36	8	21	1	66	L		1	34	5	35	4	79
R			23	9	20	4	56	R		1	32	3	28		64
Σ			59	17	41	5	122	Σ		2	66	8	63	4	143

Table XXXVII does not indicate any marked difference between left and right retouched bulbar flakes. As in the case of bulbar flakes retouches with combined retouch, the B and D types are most frequent. However, the percentage of the former form is somewhat higher than that of the latter. The relation of types C and E as compared to the bulbar flakes retouched on both edges is also altered. The deliberate retouch is therefore somewhat more often isolated, while the cutting E retouch occurs more often in combinations.

8.13.2. Retouched flakes

The principles of classification applied to bulbar flakes were also used for classifying retouched flakes, although with some modifications. Since the percussion bulb on these is not present, it is deemed too uncertain to orient the flint according to the presumable striking direction. With certain artefacts this is fully feasible, when they have been broken off next to the percussion bulb - while others show no indication of any kind of the direction of percussion. 740 flakes, 2% of the total number of flakes, are retouched over minor or major parts of their edges. 132 originate from layer 1, 598 from layer 2 and 10 from layer 3. Of these, 145 have two retouched edges (Table XXXVIII).

Table XXXVIII. Ageröd I:B. Position and types of retouch on flakes with retouch on both sides.

Position of retouch	Type of retouch									Σ
	AA	AD	BB	BD	BE	CC	DD	DE	EE	
I			11	7		1	70	20	12	121
II	2	7	1	4	1		4	3	2	24
Σ	2	7	12	11	1	1	74	23	14	145

The remaining 595 have only one edge retouched (Table XXXIX).

Table XXXIX. Ageröd I:B. Position and types of retouch on flakes with retouch on one side.

Position of retouch	Type of retouch					Σ
	A	B	C	D	E	
I		90	25	297	87	499
II	13	27	2	44	10	96
Σ	13	117	27	341	97	595

When comparing the distribution as illustrated in tables with retouched bulbar flakes, some clear-cut differences emerge (Tables XXXVI and XXXVII). Only 20% of flakes are retouched on both edges compared to 37% of bulbar flakes. Moreover, the proportion of retouched bulbar flakes and flakes is not in the same relation to the total in each respective group. The flints retouched on both edges show pronounced divergencies. One of the differences is the distribution of retouch, in that the percentage of I is considerably higher in flakes than in bulbar flakes. No attempt was made to determine orientation in relation to the direction of percussion in the case of flakes. Consequently, when retouches of both edges exceed 50% of the flint's circumference, the flake is considered to have retouch distribution I, and all others distribution II. In spite of this simplification there is an obvious divergency in relation to bulbar flakes. The same

holds true of the proportions of deliberate retouch plus frictional and frictional retouch with 10%, 13% and 77% (Table XXXVIII). The high percentage of frictional retouch shows great divergency from that of bulbar flakes, namely 22.

Combination DD is the most commonly occurring among flakes. Combinations with B retouch, on the other hand, are considerably fewer compared to bulbar flakes, namely 17% compared to 37%. Bulbar flakes and flakes with only one edge retouched also show considerable divergencies. While 46% of bulbar flakes have retouch on side exceeding 50% of the edge, 84% of flakes display the same feature. The explanation of this divergency may conceivably be found in the fact that there is a great number of small pieces with fractural edges among the flakes. It is clearly noticeable that these are fragments of primary flints which had been retouched before they were broken. The difference is not limited to the extent of the retouch in relation to the length of the edge, but is also evident in the distribution of retouch types (Table XL).

Table XL. Ageröd I:B. Distribution of retouch types among bulbar flakes and flakes with retouch on one side.

	Type of retouch				
	A %	B %	C %	D %	E %
Bulbar flakes	0.8	47.2	9.4	39.2	3.4
Flakes	2.2	19.7	4.5	57.3	16.3

A reversal of retouches B and D emerges in the two artefact groups. But even though all comparative values are divergent, the most obvious deviation is that of B and D.

8.13.3. Retouched blades

Almost all that has been said about the systematization of retouched bulbar flakes and flakes is applicable to retouched blades. Some attention has been paid to the position of retouch on blades.⁹² But retouched blades in Section B include so few type specimens that the previously established system is of little value. Instead, a classification following the same principles as in the case of bulbar flakes and flakes was carried out.

Table XLI. Ageröd I:B. Position and types of retouch on blades with retouch on both sides.

Position of retouch	Type of retouch														
	AA	AB	AD	AE	BB	BC	BD	BE	CC	CD	CE	DD	DE	EE	Σ
I	15	2	7	3	7	1	2	2	7	4	1	30	23	100	204
II	2		1		2				3	1		3	2	14	28
Σ	17	2	8	3	9	1	2	2	10	5	1	33	25	114	232

Table XLII. Ageröd I:B. Position and types of retouch on blades with retouch on one side.

Position of retouch	Type of retouch						Σ	Position of retouch	Type of retouch						Σ
	I	A	B	C	D	E			II	A	B	C	D	E	
L	1	2	6	30	76	115		L	7	8	5	19	26	65	
R	3	1	2	11	55	72		R	2	6	3	10	22	43	
?	11	6	7	20	67	111		?	8	13	6	6	22	55	
Σ	15	9	15	61	198	298		Σ	17	27	14	35	70	163	

A total of 693 flints, classified according to definition as blades, are retouched. 130 originates from layer 1, 555 from layer 2 and 8 from layer 3. 232, or 33%, are retouched on both edges (Table XLI). This percentage is in good agreement with that of bulbar flakes. Of the combined retouches, 17% are deliberate, 9% a combination of deliberate and frictional and 74% frictional retouch alone. The EE combination is clearly predominant. 77% of the blades have combinations with type E retouch. Few blades have retouch combinations covering less than 50% of the edge. Retouch distributions III and IV do not occur at all.

In the group of blades retouched on one edge only the percentage of retouch covering a short distance is

considerably higher (Table XLII). The tables also record the orientation of retouch in relation to the direction of striking. The systematization is nevertheless incomplete, since 166 blades have no percussion bulb. In spite of this a certain trend can be distinguished in the higher number of blades retouched on the left edge.

Among the blades retouched on one edge type E shows a clear-cut dominance. This phenomenon may be regarded as the most obvious difference between blades on the one hand and bulbar flakes and flakes on the other - a result which should not be surprising. Choosing a tool for scraping, short and broad flints were preferred, whereas long and slender flints with straight edges were used for cutting.

8.13.4. Retouched blade fragments

Blade fragments occupy a certain intermediary position between blades and bulbar flakes and flakes. Of these 192 originate from layer 1, 805 from layer 2 and 13 from layer 3. A number of blade fragments lacking percussion bulb and where it is possible to document their having been used after fragmentation exhibit traces so different from other blade fragments that they were assigned to a special group (Chapter 8.9).

Table XLIII. Ageröd I:B. Position and types of retouch on blade fragments with retouch on both sides.

	Type of retouch														Σ
	AA	AB	AD	AE	BB	BC	BD	BE	CC	CD	CE	DD	DE	EE	
With percussion bulb	10	1	4	7	12		3	4	2		6	53	40	62	165
Without percussion bulb	8	3	4	5	9	2	7	10	3	5	3	51	74	154	338
Σ	18	4	8	12	21	2	10	14	5	5	9	104	114	216	503

Table XLIV. Ageröd I:B. Position and types of retouch on blade fragments with retouch on one side.

	A	B	C	D	E	Σ
With percussion bulb	10	20	18	43	92	183
Without percussion bulb	15	36	19	98	156	324
Σ	25	56	37	141	248	507

The number of retouched blade fragments without percussion bulb is almost twice as much as that of blade fragments with percussion bulb (Table XLIII and XLIV). A certain difference is noticeable in that blade fragments with percussion bulb show a higher percentage - 15% - of combinations with exclusively deliberate retouch than those without percussion bulb, 7%. A more obvious difference is to be found in percentages of combinations with D and E retouches. There is a high percentage of EE among blade fragments without percussion bulb and vice versa in regard to DD. No similar difference can be seen in the blade fragments retouched on one edge only.

8.13.5. Strike-a-lights

The group of retouched blades or blade fragments includes a number of flints which are usually labelled strike-a-lights. Here, the term indicates blades with robust retouch measuring more than 4 mm and up to 1 cm in height. Because of its unevenness, this retouch is classified as type D in spite of a noticeable divergence from the norm. 75 blades - 13 from layer 1, 61 from layer 2 and 1 from layer 3 - are trimmed with this kind of retouch, and 55 of these are retouched on both edges. 14 are blade fragments with percussion bulb, while 5 are blade fragments without percussion bulb. Although very similar to D retouch, it is questionable whether such robust retouch really might have been caused by scraping. Not only is this retouch unusually high, it has also a less acute angle in relation to the edge than on other flints with D retouch. Nor is it unusual that the retouch shaped the edge concavely. This is particularly noticeable on blades with retouch on both edges. What these flints were used for is indicated by the term strike-a-light. It may be pointed out, however, that the flints in our assemblage never exhibit the same kind of wear traces, i.e. a dulled edge, which specimens serving the same purpose exhibit during the Late Neolithic and the Bronze Age.

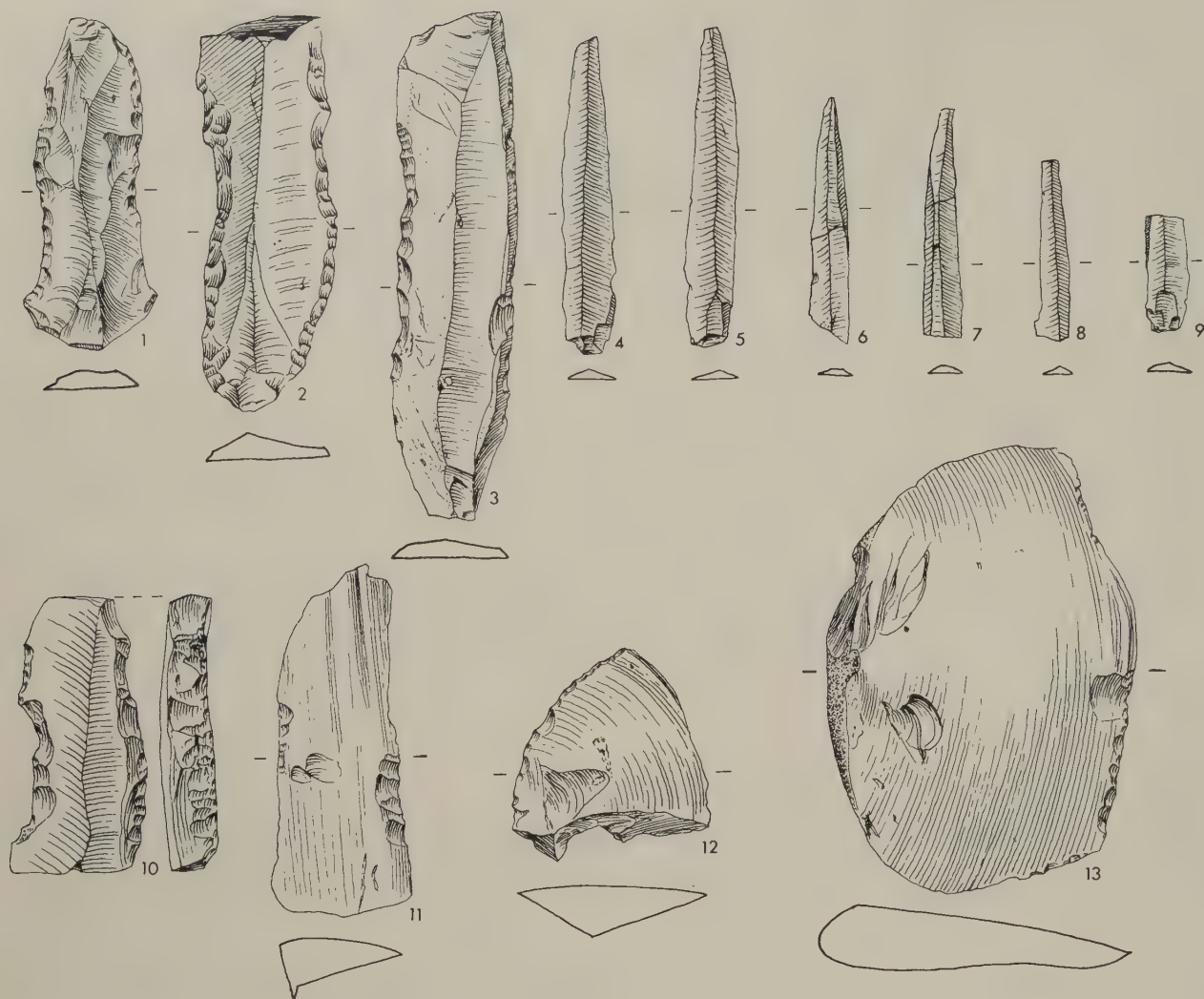


Fig. 67. Ageröd I:B. Retouched bulbar flake (13), flake (12), blades (1-3 and 11), micro-blades (5 and 7) and strike-a-light (10). The micro-blades were found close to each other. 1:1.

8.13.6. Retouched micro-blades

There are 350 microblades with retouch; of these, 66 are from layer 1, 279 from layer 2 and 5 from layer 3. In relation to the total number of micro-blades, this may be regarded as low - 4% only. It is also low when related to the number of retouched blades, namely 12%. The explanation is that if a micro-blade was affected to the same degree as a blade while being used, it would break before such pronounced wear traces as may be observed on the blades could come into existence. In other words, the brittler the material, the less wear it tolerates. Since the precondition was to document wear traces that could be seen by the naked eye, not too many retouched micro-blades qualify. Only frequent use leaves obvious wear traces on a flint edge. In spite of this source of error adherent to the examination method, the overall picture of distribution of wear traces should enable one to draw general conclusions about function. Grouping is made according to chapter 8.13.1.

Table XLV. Ageröd I:B. Position and types of retouch on micro-blades with retouch on both sides.

Position of retouch	Type of retouch						Σ
	BB	BC	BE	CC	CE	EE	
I		5	6	8	15	7	41
II	2			3	3		8
Σ	2	5	6	11	18	7	49

Table XLVI. Ageröd I:B. Position and types of retouch on micro-blades with retouch on one side.

Position of retouch I					Position of retouch II				
Type of retouch					Type of retouch				
B	C	E	Σ		B	C	E	Σ	
L	2	20	53	75	L	7	17	1	25
R		4	69	73	R	8	10	3	21
?	12	20	58	90	?	11	4	2	17
Σ	14	44	180	258	Σ	26	31	6	63

Most obvious is the low percentage of retouch on both edges, only 14% as compared with 33% of blades (Table XLV and XLVI). Also, a high frequency of deliberate retouch emerges which is explained by the above given arguments. No A retouches occur - micro-blades are too thin. It is to be noted that B retouch is mostly documented along a short portion of the edge. In addition, it also is concave on the majority of micro-blades, in which case it may indicate preparatory work for microlith production. Frictional retouch occurs less often along more than half the length of a micro-blade.

Another striking feature is the absence of type D retouch. The predominance of frictional retouch on one edge only may be reasonably explained if we take into account documented functions of micro-blades. Thus, the only known artefact group comprising micro-blades is that of slotted bone or wooden points.⁹³ In a composite artefact, only one edge will be affected by wear, while the other, fastened with resin in bone or wood, remains intact. This circumstance explains the low percentage of combination EE. On a slotted bone point found in Denmark, deliberate retouch was documented on the edge set in resin.⁹⁴ One retouched and one exposed edge may result in combinations BE and CE. On the Swedish examples, however, the deliberate retouch occurs on the free standing edge and probably served to remove protruding parts.⁹⁵ There are no micro-blades in Section B showing combination CE on the same edge, as could be expected.

Minor concentrations of micro-blades with frictional retouch were documented on two occasions. In layer 2, six closely packed micro-blades were found (Fig. 67:4-9). They can be arranged in pairs according to their length. In the refuse area of layer 2 four micro-blades of about the same size were found. They are probably the remains of some slotted artefact that has been discarded. Such arrangements in pairs of micro-blades of the same size is very common among slotted bone points.

Surveying the micro-blades of slotted bone points as to their traces of wear, it was noted that a good 12% had such obvious retouch that the alteration of the edge made them equivalent to those registered under type E.⁹⁶

8.14. Flints with incisions

45 flints from Section B are provided with incisions on their calcareous crust. In most cases the preserved areas are very small. Only in one case does the incised area exceed 10 cm². Thus, it is impossible to get an impression of the original look of the incisions. On each flint, only part of the incision is preserved.⁹⁷ The incised flints are divided into four groups of patterns:

1. Two groups of parallel lines crossing each other, whereby four-sided figures are formed.
2. Parallel lines.
3. Incised lines that do not cross each other.
4. Incised lines crossing each other without any visible system.

Table XLVII. Ageröd I:B. Distribution in layers, patterns and primary material of flints with incisions.

Layer	Groups of patterns					Σ					
	1	2	3	4	Σ						
1	3	2	3	1	9		bulbar flakes	flakes	blades	micro-blades	flake core
2	7	15	3	11	36		24	13	5	2	1
Σ	10	17	6	12	45						

Parallel strokes are the most frequently occurring pattern (Table XLVII). The lines may occur with regular intervals, but in most cases this symmetry is absent. The irregular incisions form the next largest group. Group 3 may be seen as a special case of group 4 - in these lines, not crossing each other, a certain regularity may be perceived.

Only in group 1 are there geometric figures that have certain affinities with the motives occurring on incised antler and bone.⁹⁸ Such a basic motive is present on the crust of one flint, overlapped by asymmetrically distributed strokes. This flint and another item belonging to group 1 exhibit grooves of two different widths. The other examples were each incised individually, with the same tool, i.e., with incisions of the same width for each individual flint. The uniform width and depth of the grooves may vary from flint to flint. In most cases a narrow, pointed tool was used and thus the result was a deep and narrow groove with sharp-angled, pointed bottom. In addition, there are grooves which are wide, seen in relation to their depth and have a planar bottom of the same width as the rest of the groove. This latter form is well in accordance with that created by a burin.

This kind of incision was observed for the first time in South Scandinavia when examining the flint material from Ageröd, on which occasion 92 examples were distinguished.⁹⁹ Certain incised areas were not large enough to observe a conscious composition in the incised lines. According to Althin these lines were drawn with two different intentions. On the one hand, they might be meant to be decorations, but they could also have a practical purpose, namely the indication of demarcation lines for striking, e.g., a flake from a core.

On the two micro-blades and on two of the five blades the direction of the lines is more or less the same as the long axis of the flint - which supports Althin's theory about the practical function of the incisions.

After Althin had called attention to the existence of this kind of incisions, similar ones were found on flints from settlement material both in Denmark and South Sweden from the entire Mesolithic.¹⁰⁰ Two later finds have also contributed to a much better understanding of this kind of incisions. From the Danish settlement site Holmegaard V originates a collection of flints from a limited area, which could be fitted together into a 21 cm long nodule.¹⁰¹ On its crust this nodule was provided with incisions of well-known motives of Mesolithic ornamentation. On the occasion of the examination of flints from Section HC found in 1973, a core was found which could then be pieced together with an incised flint from Althin's find material.¹⁰² Although one part of the original core is still lacking, it is possible to follow an incised band over half of the preserved crust. On the remaining areas it is clearly visible that the calcareous layer was scraped off intentionally. Two flints from Section B exhibit similar scratched marks (Fig. 68:2).

8.15. Stone flakes

Compared to the number of flints, the stone flakes are few in number. There are 9, all from layer 2, of which 4 are of basalt, 2 of quartzite, 1 of diabase, 1 probably of diorite and 1 of hälleflinta. Two pieces of quartz not definitely identified as flakes may also be classed in this group. Their size varies from 2.9 x 2.8 cm to 1.7 x 1.7 cm. Three flakes of basalt exhibit the remains of ground surfaces.

According to the morphology and the traces of wear, one of the ground flakes seems to have been detached from the cutting edge of an axe like axes nos. 4-6 (Chapter 8.10.4). This means that only 5 flakes originating from the manufacture proper remain. However, a number of factors may explain why so few preserved stone products were found. As already mentioned in connection with the stone axes, the surrounding soil may have affected the stones and thus altered their original shape. Another reason may lie in the fact that the members of the team working on the investigation had a very thorough knowledge of flint artefacts and waste products originating from their manufacture, but very scanty experience, or none at all, in regard to stone artefacts. To lessen the effect of this latter factor, special care was taken in examining meticulously every stone measuring less than 5 cm, but in spite of this, the number of preserved flakes did not increase.

A possible explanation would be that the stone axes were brought as semi-finished products to the site, where only the time-consuming final grinding was carried out. As mentioned above, one such rough-out is preserved. Also the large number of preserved grindstones supports this theory.

8.16. Ochre

Both in layer 1 and in layer 2 on some occasions a number of lumps of a red matter of varying consistency were found. Some of the lumps had a hard core and only a thin, weathered, yellowish-red outer shell, and produced little or no colour at all when rubbed on some soft material. Others had a uniform soft consistency, and these lumps left intensive red marks. Since Ageröd I lies in an area where numerous ferrous and ferric minerals occur, some of the lumps might have landed purely by accident in the artefact-producing layers.¹⁰³ Others, particularly those of soft consistency, may have been brought

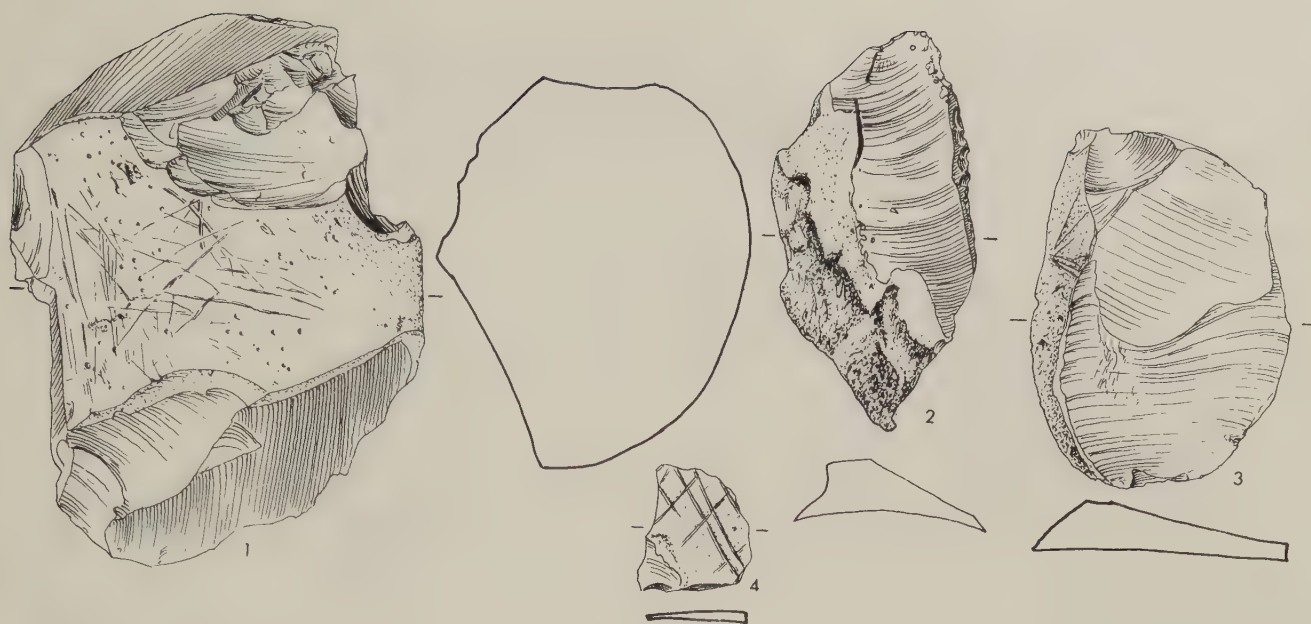


Fig. 68. Ageröd I:B. Flints with incisions (1 and 3-4) and with scraping traces on the calcareous crust (2). 1:1.

there intentionally by people to be used for colouring. The use of red ochre in Mesolithic times has been documented previously, in settlements as well as in graves.¹⁰⁴ A selected number of lumps found at Ageröd I were analyzed.¹⁰⁵

Table XLVIII. Ageröd I:B. Content of zinc, iron and nickel of lumps with red colour.

Layer	Zn %	Fe %	Ni %
1	1.14	5.24	2.42
2	10	42	2
2	7.13	12.62	
2	1.08	7.19	1.16
2	1	6	3
2	0.09	5.79	2.3
2	1.01	4.83	2.05
2	0.5	4.8	0.5
2	1	3.5	
2	0.9	3.29	
2	0.93	2.6	
2	1	2	
2	0.8	1.65	
2	0.74	1.64	

It is evident from table XLVIII that the samples show considerable differences in their iron content. The lumps that are most porous and have the most intensive red colour have a high iron content, while that of the harder lumps is considerably lower - less than 4%. One interesting detail of the analysis is that the soft, red samples with high iron content also contain nickel, while those with low iron content contain none. On the basis of the results it may be assumed that lumps with a iron content of more than 4% could very well have been used for colouring or dying. In point of fact, minerals with less iron content are also documented to have been used as ochre.¹⁰⁶

8.17. Artefacts of bone, resin and wood

Conditions for preservation of organic matter are rather bad in Section B, so that the number of preserved artefact types is very limited. Because of their special shape a number of fragments of slotted bone points

could be identified. They are:

- No. 1. A fragmentary example, slightly tapering, with two opposite grooves (Fig. 69:2). Length, width and depth are 2.2 cm, 0.6 cm and 0.5 cm respectively. One face is plane, the opposite slightly convex. The grooves, 0.20 cm in width and 0.25 cm in depth, contain no remains of resin.
- No. 2. A fragment damaged by fire. Length, width and thickness are 1.7 cm, 0.6 cm and 0.5 cm respectively (Fig. 69:3). The fragment has two opposite grooves with a width of 0.15 cm and a depth of 0.15 cm. Both faces are convex.
- No. 3. Fragment damaged by fire, 0.9 cm long, broken at right angles to the long axis and also lengthwise at the thin part between the two opposite grooves. These had a depth of 0.2 cm. The width of the fragment is 0.6 cm. The preserved face is slightly convex.
- No. 4. A dissolved fragment, which fell into four parts during conservation. The largest of these is a 1.3 cm long piece with two opposed grooves. Width and thickness respectively are 0.7 cm and 0.6 cm. The width of the grooves is 0.20 cm and their depth 0.25 cm. In the grooves there were minor pieces of resin preserved.
- Nos. 5-6. Two fragments damaged by fire, found close to each other. One is 0.8 cm long, the other 0.5 cm. The width was 0.5 cm, the thickness 0.4 cm. It is not possible to measure the width of the two opposite grooves. Their depth is 0.2 cm. One face is slightly convex, the other is flat.
- No. 7. A fragment, 0.9 cm long and 0.4 cm wide. There are traces of two opposite grooves which were 0.15 cm deep. One face is convex, the other plane.

Like all other bone artefacts in Section B, the fragments of slotted bone points were found in layer 2. The bone artefacts listed above are made of shaft bones. The straight shape and the thickness of the bones indicate that the implements were probably made of cannon bones of red deer.

Point made of a roe deer metacarpal. The slightly fragmentary point is 11.5 cm long (Fig. 69:1). Its width is 1.5 cm, its thickness 0.8 cm. The shaft bone was split in the middle, and the sharp edges were ground smooth so that all traces of manufacture have disappeared. On one face are two shallow, 0.5 cm wide grooves running lengthwise. They are probably traces of wear.

Worked right metacarpal bone of wild boar. A fragment damaged by fire, which bears traces of cutting on one end. Next to these cuttings runs a 0.1 cm wide and 0.1 cm deep groove along the preserved part of the bone.

In spite of the fact that the slotted bone points found in Section B were strongly fragmented, they cannot originate from the same bone point, as indicated by a certain variation in width and thickness and in the width and depth of the grooves. Surveying a more extensive material, it was found that the variation in measurements of one and the same slotted bone point was slight.¹⁰⁷ The greatest variation emerged from the measurements of width taken on that part of the slotted bone point which is slotted. The width and depth of the grooves showed a variation range less than 0.1 cm. The differences, particularly those in depth of the grooves, cannot be explained satisfactorily by a shrinkage of the bone resulting from vigorous heating. The highest value for shrinkage - 24.4% - as recorded, falls within the boundaries of purely erroneous measurement so far as the present material is concerned.¹⁰⁸ It may also be pointed out that the distances between the individual find places are considerable. Therefore the fragments of slotted bone points found in Section B must originate from at least 2 examples. One fragment exhibits a tapering of the bone body, thus belonging either to the base or the point part.

In the culture layer only one bone fragment with incision was encountered. It consists of two parts of a red deer rib, found next to each other. They belong to the same object, although fractural and contactual surfaces are not definitely ascertained. One of the fragments has a length of 2.8 cm and a width of 0.8 cm. Its thickness is 0.4 cm. One face - A - is slightly convex. On this face several W-shaped incisions can be documented (Fig. 69:4). The original decoration probably consisted of independent W-shaped figures which, in groups of three or four, formed bands at right angles to the long axis of the object. In the upper left corner are fragments of a figure - an angled line from which short strokes issue. The area is accentuated even more since it forms a raised part in the bone surface. The opposite face - B - is provided with two lines running along the two sides a few millimetres from the edge. Short, oblique strokes issue from these lines. The short strokes are more pronounced on the right. The other fragment of the object is 2.0 cm long and 1.7 cm wide. The side edges show a tendency to converge. Only one face is preserved completely on the smaller fragment, and on it the terminals of the two edge lines are visible. On the opposite, damaged face there is only a short stroke which is probably part of a W-motive.

The fact that the incisions are clearer visible on one half of the face is hardly explainable by varying states of preservation. When closely examining decorated objects from the Mesolithic, Clark found distinct traces of wear on decorated areas.¹⁰⁹ Since both faces show wear on the same half, this obviously indicates that the object functioned in such way that one side was exposed to wear, but not the other. The fragments have certain affinities with the decorated bone knives found on Danish settlement sites.¹¹⁰

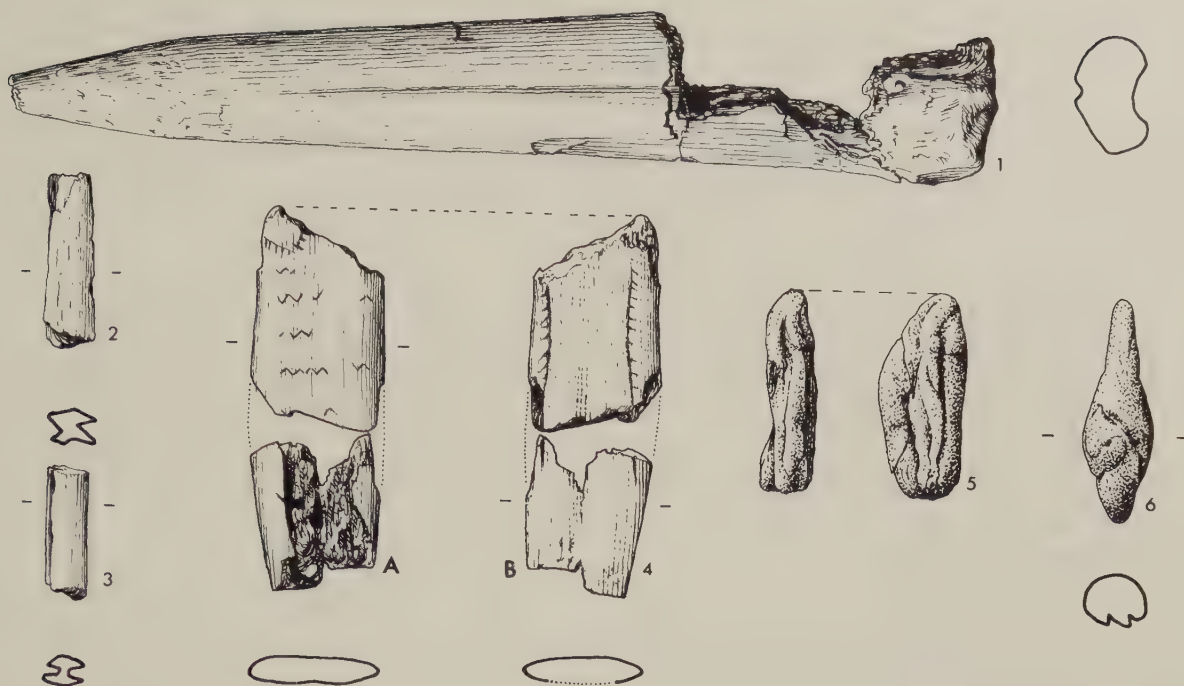


Fig. 69. Ageröd I:B. Artefacts made of bone. 1: bone point, 2-3: fragmentary slotted bone points, 4: rib fragment with incisions and 5-6: pieces of resin. 1:1.

Judging by the wear traces, the object was used in working some soft material such as skinning or stripping bark. The fragments described here very likely formed the end part of the object.

The organogene remains of the settlement include two pieces of resin. The larger one is 2.7 cm long and its width is 1.1 cm (Fig. 69:5). The smaller, teardrop-shaped piece of resin is 3.0 cm long and has a width of 0.9 cm (Fig. 69:6). Both pieces bear traces of having been pressed together. Both show minor depressions in their surfaces which may be interpreted as caused by the pressure of fingertips. Apart from these two examples, there was resin in the groove of one of the fragments of a slotted bone point (No. 4).

There are several examples from the Mesolithic of the extensive use of resin as an adhesive. Its importance was most notable in binding flint to bone or wood. Exemplifying this are the slotted bone points and the wooden points, where the flints were set in the grooves with resin.¹¹¹ Resin was also used to fasten single flints, usually microliths, to a shaft, - the arrows from the Loshult bog document this procedure clearly.¹¹² Moreover, some microliths were found with clumps of resin still adhering to them.¹¹³ On several slotted bone points some of the resin is still preserved on the base. On some of them the resin is so well-preserved that its function as an adhesive, fastening a bone point to a wooden shaft, is clearly visible.¹¹⁴ Two finds from Scania represent the use of resin connected with fastening by lashing. One is a barbed bone point from Råbelövssjö with transversal bands of resin preserved on those parts of the shaft which the lashing material - now completely disintegrated - left free.¹¹⁵ At Ageröd I:HC a thin plate of bone with one plane and one slightly convex face was encountered and interpreted as one half of a shaft. On it were transversal bands of resin and traces of impressions of the twisted thread used for fastening.¹¹⁶ A pick coming from the bog of Lyby southeast of the Ringsjö lake and previously dated to the BO 1, is now, after thorough examination of the dislodged peat sequence, considered to belong to the BO 2 or the Early AT 1.¹¹⁷ The pick has incised ornamentation which has been filled with dark resin as a contrast to the light colour of the bone. Other examples of this use of resin exist too.¹¹⁸

Gas chromatography and spectral analysis showed that modern pitch of birch-bark and resin caulking from grave goods vessels dated to the Late Bronze Age and the Early Iron Age are exactly alike.¹¹⁹ The rolls of birch-bark found at the site Star Carr may, according to Clark, be connected with the manufacture of resin - the resin may have been extracted by distillation.¹²⁰ We should not disregard, however, that stripped birch-bark might have had other uses, such as basket weaving.¹²¹ In Section B, on some occasions rolls of birch-bark similar to those from Star Carr were encountered. When analyzing some resin from Kunda in Estonia, it was found to contain not only birch pitch but also traces of grease, spruce resin, manganese, iron oxide, lime and natron.¹²² The fatty matter was probably added to render the melting point of the resin lower and to make the substance easier to work.¹²³ There is also information

about wax having been mixed with resin to soften it. There are also some finds of resin from Mesolithic sites showing traces of chewing.¹²⁴ One such piece of resing with clear tooth marks of a man about 17 years old was found at the Early Atlantic settlement at Segebro.

When the southern part containing organogene sediments of Section B was investigated, a large amount of wooden sticks were found, bearing obvious traces of having been in contact with fire. The find positions were for the most in the lowermost centimetres of layer 2. The sticks varied in length as well as in thickness. The majority were 15-25 cm long and 1.5-2.3 cm thick. In most cases only one end of the sticks was charred.

Out of the about one hundred sticks, ten were selected for wood anatomy.¹²⁵ The wood was in all cases pine. In some cases, branches of convenient size were used, while the majority were originally thicker split branches. The most obvious interpretation of these sticks is that they are the remains of firewood, thrown into the water when putting out the fire. They could of course have had other uses too, for instance serving as torches when fishing by night. The relatively uniform thickness of the sticks speaks in favour of this last theory - they would be just about the right size to be held comfortably in the hand.

8.18. Neolithic artefacts

In a find material of such extensive size as that in Section B, it is not unusual to encounter some artefacts whose chronological identity deviates essentially from that of the rest. A waste product measuring 3.1 x 2.8 cm - the fragment of a polished flint artefact and found in layer 1 - belongs to this category (Fig. 70:1). Judging by the sharp angle at which the two ground surfaces meet, the waste piece must have been part of the cutting edge.

Two undecorated potsherds, both from the upper part of layer 2, were also found in Section B. Their sizes are 2.6 x 1.6 cm and 2.4 x 1.8 cm respectively. The thickness of the light brown ware is 1.2 cm. The size of the temper grains is 0.5 cm.

In the trench dug in 1972 between Sections B and D, part of the cutting edge of a polished flint axe measuring 3.6 x 1.5 cm was found. The fragment came in all likelihood from an axe with concave cutting edge. All three preserved surfaces are ground. This axe type is mostly found within the Battle Axe Culture, but also occurs in the Funnel Beaker Culture and the Pitted Ware Culture.¹²⁶

The polished fragments and the potsherds originate from the Neolithic. Both surface finds and excavated finds of Neolithic artefacts are recorded within Ageröd I.¹²⁷ On the hill located above Section B both thin-butted and thick-butted polished flint axes came to light in the course of ploughing. A cord-decorated potsherd came from Section E, that is, the slope of the hill above Ageröd I:HC, thus documenting man's presence in the area during the late part of the Early Neolithic.

To state the cultural affiliation of two transverse arrowheads is more difficult (Fig. 70:2-3). One is made from a blade, the other from a flake. Since in shape they are clearly divergent from the various types of trapezes they can hardly be said to be extreme variants of broad trapezes (Fig. 39:D). Both have a cutting edge at right angles and straight sides, i.e., they are examples of transverse type DO I 99.¹²⁸ During the Mesolithic this type is mostly represented in the early stage of the Ertebølle Culture, but it also occurs during the Neolithic.¹²⁹ It is therefore quite acceptable to consider the transverse arrowheads as contemporaneous with the axes fragments.

A transverse arrowhead Althin found led him to describe Section B as a settlement which had been inhabited during several different periods.¹³⁰ The reader thereby gets the impression that the remains of the older settlement were lying immediately next to the ground surface for a considerable time. But as we have seen, the stratigraphic investigations accounted for previously in the present work contradict this assumption (Chapter 6.2). The fact that both transverse arrowheads were encountered in layer 1 may be a sign that the indicated erosion had taken place prior to the deposition of the arrowheads.

Welinder analyzed the reasons why Neolithic artefacts are frequently found in conjunction with Mesolithic settlements.¹³¹ He thinks that the distribution of Neolithic artefacts around the Ageröd bog constitutes a good example of how attractive the region was even during the Neolithic for hunting and fishing. For the particular area here in question this explanation may be doubted because of the radically altered ecology owing to the process of overgrowth (Chapter 6.3). The region might also be imagined as a source of raw material - gathering flint - although this theory is hardly convincing, since the artefact-producing strata had most likely already been overlain prior to this period and was therefore not easily noticed and accessible.

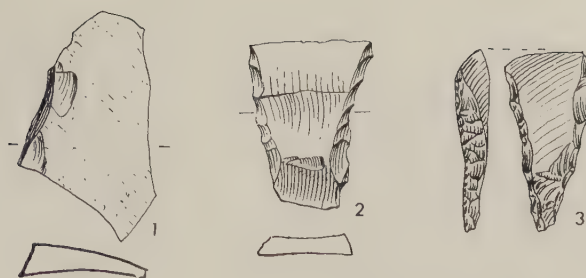


Fig. 70. Ageröd B. Fragment of polished axe (1) and transverse arrowheads (2-3). 1:1.

Even though relatively inhospitable, the northern areas of the Ringsjö basin could still have supported an agricultural population, at least for a short while, during the Early Neolithic. Traces of the Early Neolithic Funnel Beaker Culture are documented there. The tract may also, and for a considerably longer time, have been used for pasture. The zone between the waterlogged parts of the raised bog and the surrounding mixed oak forest, namely the vicinity of the former lake shore, is the most likely to have been the scene of human activities.¹³²

In the course of reconnaissance of the terrain next to Ageröd I, some worked flint was documented in the field located north of Section B. Both Mesolithic and Neolithic artefacts were gathered, but no systematic collection of surface finds was undertaken. The area around the foot of the hill, which is also included in the field, appeared poor in finds and practically empty. It is therefore wrong to see the surface finds of the field as an extension of the find-producing layers of Section B, since the two areas are separated by an about 30 m wide belt. On top of the hill and on the northward slope a few artefacts were collected. The area within which these stray finds were documented measures 140 x 110 m. It was subsequently mapped as to its phosphatic content, taking samples from every 10 m. These samples were taken from immediately below the plough-soil, the latter seldom exceeding 25 cm in thickness. The samples were also suitable for documenting possible traces of a culture layer – such, however, were not found. Nor was there any noticeable difference in the colour of the plough-soil and the underlying, undisturbed layer of soil. The results of the phosphate mapping are illustrated in fig. 71. The phosphate values of the samples vary from 15 to 105. The lower values are chiefly spread over the western part of the investigated area. Those patches where the samples showed more than 75 phosphate degrees could not subsequently be brought into correlation with any increase in density of surface finds.

9. Section D

In recording the artefacts encountered in Section D, only those coming from the D settlement and its closest surrounding will be dealt with. Finds originating from the other investigated areas of Section D will be included if and when they are of particular archaeological interest or when they may be especially valuable for shedding light on how the stratigraphies of the artefact concentrations Ageröd I:B and Ageröd I:D are related. Those artefacts that were found in the central parts of the main Trench B or the westernmost parts of Trench D3, on the other hand, cannot be connected with any particular settlement (Fig. 5:A). Although this would not be the case with finds from the western part of Trench D 1, since they may very well belong to the beach settlement Ageröd I:B, unfortunately the journal in which all measurements regarding these finds were recorded could not be found. Even the scientific value of the artefacts found in Trench D 1 may be questioned. The majority of these were uncovered while stripping and have all the characteristic sources of error inherent in this kind of material. Quantitatively seen, therefore, the records about the material given below will not be in accordance with Althin's list about the finds, since he included all artefacts found in Section D in his list about Ageröd I:D.¹³³ Moreover, those artefacts that were taken care of in the course of excavating that part of the main Trench B which is directly connected to the D settlement have been assigned to the latter and not to Section B.

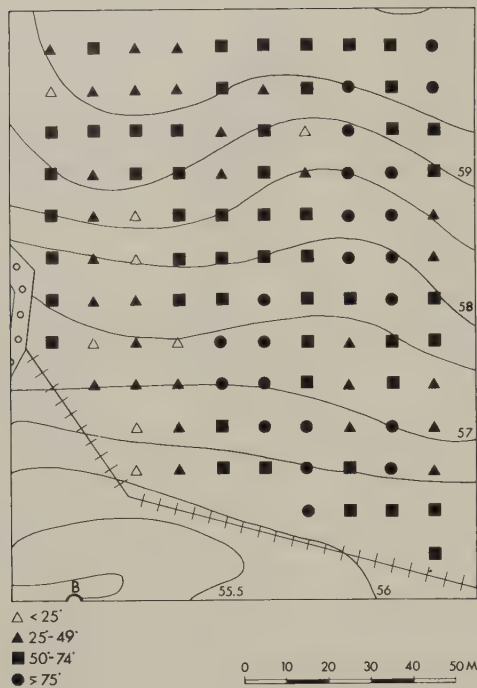


Fig. 71. Map of area north of Section B with phosphate values.

9.1. Cores

A total of twenty cores were found, distributed as follows: blade cores: 2, micro-blade cores: 13, flake cores with platform: 3 and multiplatformed cores: 2.

The two blade cores are both of type B, but their striking angle platform/working face exceeds 90° . Both blade cores are provided with retouch, meaning they might have been used as scrapers. They weigh 185 g and 125 g respectively.

All 13 cores bearing negatives of at least two detached micro-blades are handle-cores. On two of these, the micro-blades were detached from both ends. Three handle-cores have no retouch along the long side. Retouch on both long sides occurs on only two of the items. Five of the remaining eight handle-cores have retouch on the left edge. The maximum number of micro-blades from the 13 handle-cores is 86, while the number of negative traces satisfying requirements of proportional relationship of micro-blades is 65.

Two out of the three flake cores - type D - have one single platform each, while the third is provided with two opposite platforms. All three have striking angles less than 60° and can thus be classified as plane-scrapers. Another item had retouch along its platform edge. The weights of the three cores are 65 g, 15 g, and 5 g respectively.

One of the multiplatformed cores - type E - has a length measuring less than 5 cm (3.8 cm). Their weights are 180 g and 20 g respectively.

9.2. Rejuvenation flakes

The 21 core rejuvenation flakes from core-types A, B and D found at site D have the distribution as in table LXIX.

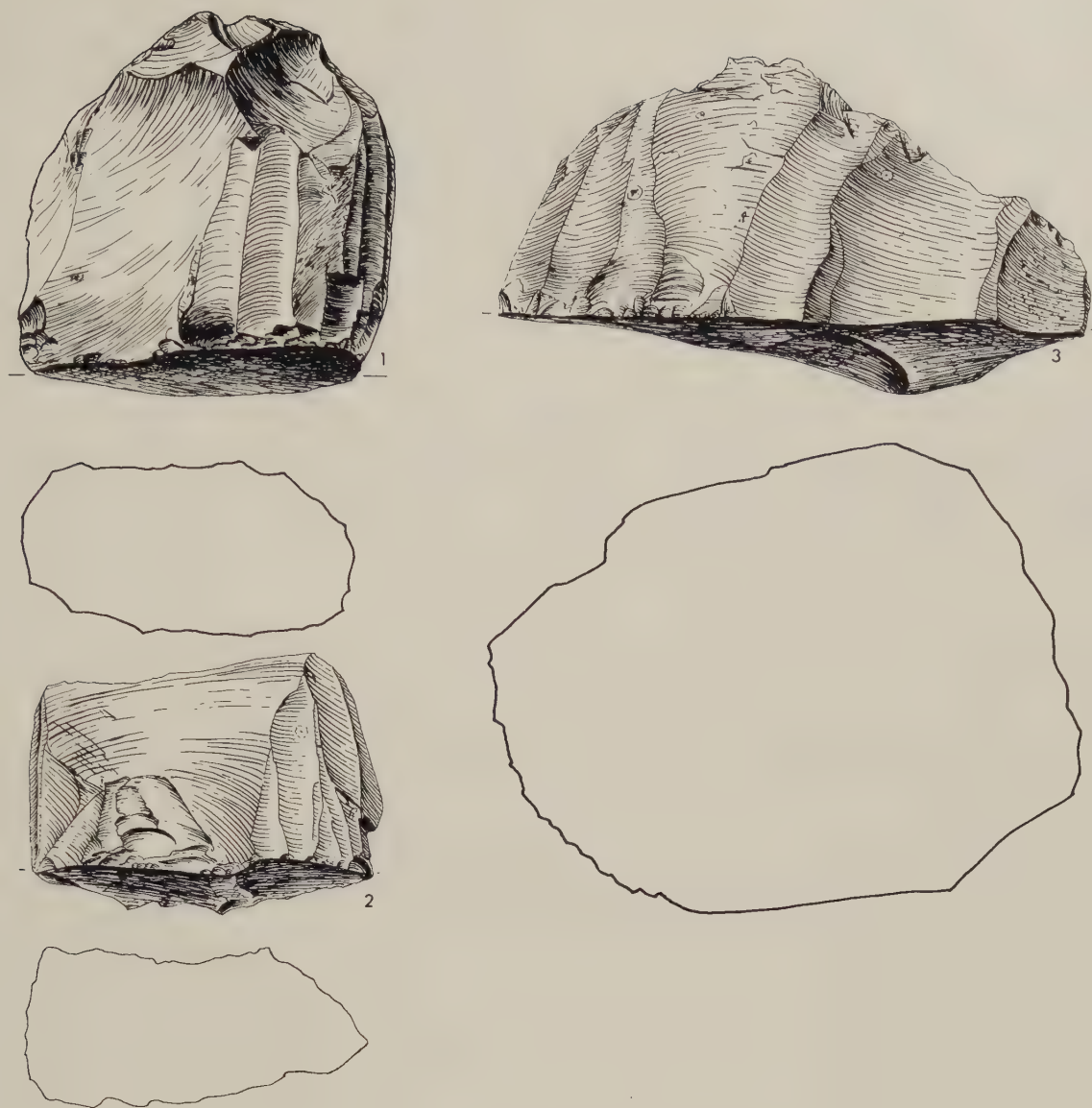


Fig. 72. Ageröd I:D. Handle-cores (1-2) and rejuvenation flake from a blade core (3). 1:1.

Table XLIX. Ageröd I:D. Distribution in types and origin of rejuvenation flakes.

Type	Flake cores	Blade cores	Σ
A	14	2	16
B	2		2
C	1		1
D		2	2
Σ	17	4	21

According to the classification, 17 core rejuvenation flakes derive from flake cores, while 4 were detached from blade cores. The latter all have a striking angle platform/working face of the core exceeding 90° , i. e., they likely derive from blade cores of type A. One flake removed from a flake core also has a similar striking angle. One core rejuvenation flake was detached from a retouched platform edge. The two flakes where the whole platform is detached have a length of 7.6 cm and 6.8 cm respectively.

The relation of the number of cores to the number of rejuvenation flakes is 1:4.2. This is an indication of the cores having been utilized intensively at settlement D. The ratio blade cores/flake cores is 1:1.5, while that of blade-cores/rejuvenation flakes is 1:5.3, i. e., we have an overrepresentation of rejuvenation flakes deriving from flake cores as compared to such deriving from blade cores. This observation is quite interesting inasmuch as the relationship in Section B was just the opposite.

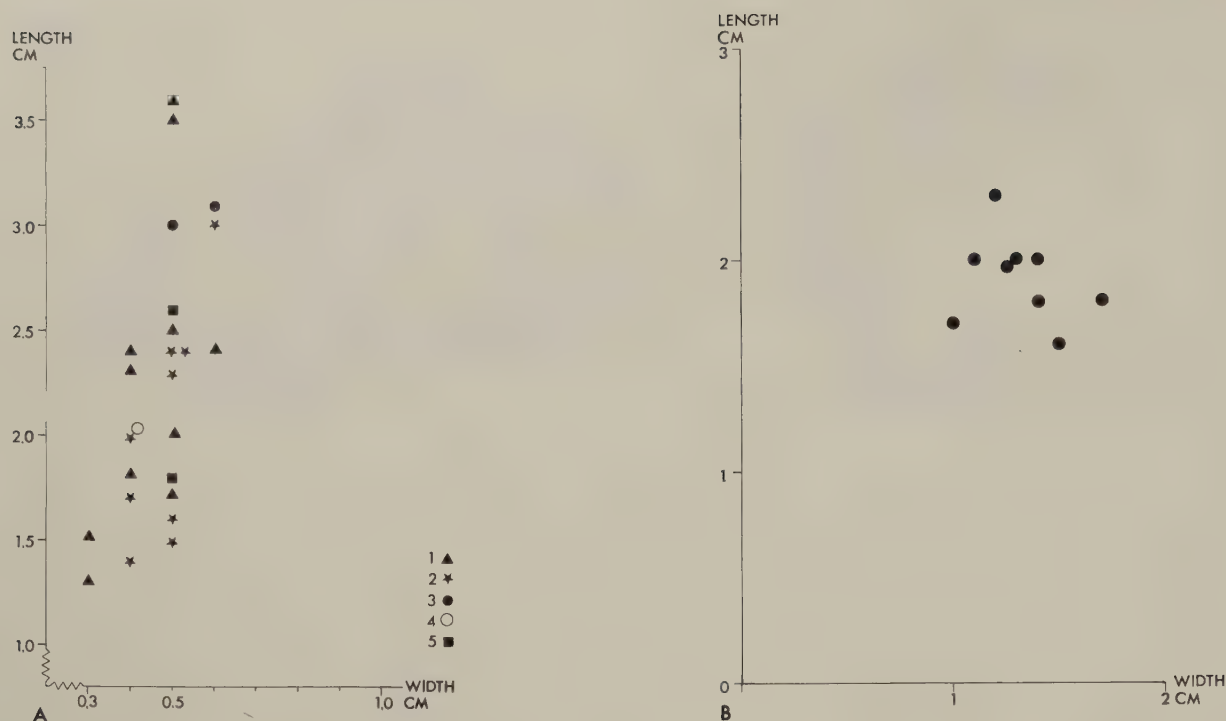


Fig. 73. Ageröd I:D. Length-width correlation of narrow microliths (A) and broad trapezes (B). Legend for the narrow microliths; 1: aI, 2: aII, 3: aIII, 4: aIV and 5: narrow trapezes.

There are 15 rejuvenation flakes detached from micro-blade cores. One flake derives from a major part of the percussion platform while the others consist of the working face for detaching micro-blades. Among these are flakes struck both from the platform and from the upper part of the core.

9.3. Microliths

9.3.1. Narrow microliths

As in Section B, the largest artefact group consists of narrow microliths. There are 110 flints classified as microliths, 25 of them intact. They form two different groups, triangles and narrow trapezes.

23 out of the 25 intact microliths are triangles. They are distributed typologically in table L.

Table L. Ageröd I:D. Distribution in position of retouch and morphology of triangle microliths.

Position of retouch	Brinch Petersen's typology					Welinder's typology					Svaerd- borg	Σ
	1	2	3	4	5	50 45	35 44	20 34	15 19	0 14		
a I		1	2	5	3			2	1	8	7	11
a II	1		2	3	3	1		1		7	6	9
a III				1	1					2	1	2
a IV				1						1	1	1
Σ	1	1	4	10	7	1		3	1	18	15	23

The triangle type retouched only on the shortest side - a I - dominates (48%). The step to the next most numerous type - with a total retouch of side C, - aII - is not quite as marked as to the two types with partial retouch of side C. Isolated from the other microliths of a II is a single isosceles triangle. In spite of its uniqueness, the find circumstances indicate that it really belongs to the settlement layer.

The two remaining intact microliths were defined as narrow trapezes, both of type 7 a.

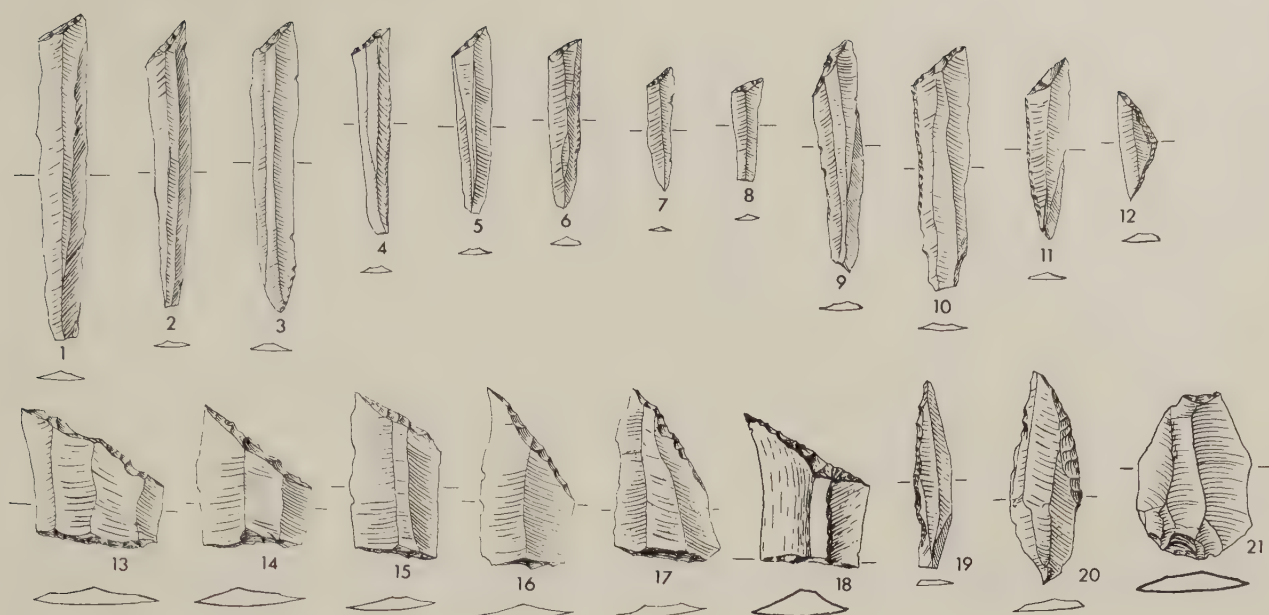


Fig. 74. Ageröd I:D. Narrow microliths (1-12 and 19-20), broad microliths (13-18) and broad microburin (21). 1-8: retouch distribution AI, 9: retouch distribution AIV, 10: retouch distribution AIII, 11-12: retouch distribution AII, 13-18: type 4, 19-20: type 6a and 21: type Ab. 1:1.

Fig. 73:A illustrates the correlation between length and width of the microlith types. No difference between the various types is observed. Their variation in length is 1.3 - 3.6 cm, the mean 2.2 cm. The variation in width is 0.3 - 0.6 cm, the mean 0.5 cm.

A survey of the fragmentary microliths shows that the above account of the microlith inventory of the D settlement is not complete. Among the fragmentary microliths are three items that can be determined as being lanceolates of type 6 a. Two of these deviate in width from the rest. Their width is 0.9 cm, i.e., 0.3 cm wider than any other narrow microlith - which in this connection is a considerable difference.

A large part of the microliths, 32 items or 29%, are damaged by fire. One of the fragmentary triangle microliths has a length exceeding the maximal length of intact microliths. Measuring 4.1 cm, this microlith, though a fragment, is the longest of all microliths found in both Section B and Section D.

Only four - three triangles and one lanceolate - specimens of all microliths found at the D settlement, exhibit a right oriented retouch of side A.

9.3.2. Broad trapezes

Of the 9 broad trapezes from the D settlement, all have the shape characteristic of type 4. The distribution of values L and W may be seen in fig. 73:B. The correlation values lie relatively well concentrated. The mean values for L and W respectively are 1.9 cm and 1.3 cm. The deviation of the angle V^2 from the horizontal plane is illustrated in fig. 75. The angle of the majority of the trapezes measures somewhat more than 90° . The variation of V^1 , illustrated in fig. 75, ranges from the intervals $30-35^\circ$ to $65-70^\circ$. The mean of V^1 is 50° . Of the total of trapezes, 3 have an angle measuring less than 45° . All examples have a right oriented retouch on side D.

No case of a facet fracture was recorded. On the other hand, one trapeze is provided with retouch running only half the length of side B.

Three flints were judged to be unfinished trapezes which have an unretouched fractural facet along side B. One example has a clear-cut facet from a micro-burin break, thus constituting an important proof of micro-burin technique having been applied even in manufacturing broad microliths. As for the values of L and W, they agree well with those of broad trapezes. All three examples have right oriented retouch on side D.

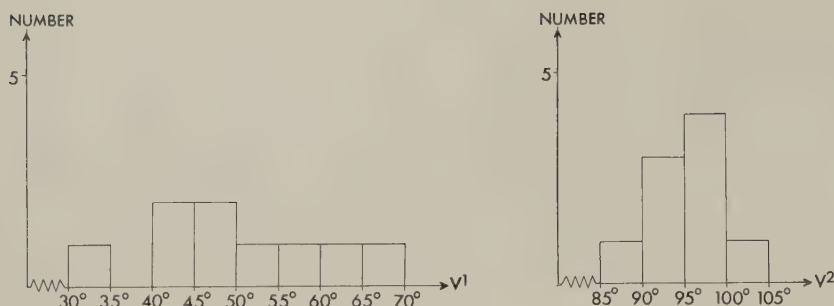


Fig. 75. Ageröd I:D. Distribution of angles V^1 and V^2 of broad trapezes.

9.4. Micro-burins

Micro-burins are not dealt with in Althin's treatment of Ageröd I:D. A systematic survey of the fragmentary micro-blades resulted in 40 narrow micro-burins, later completed to a total of 44 items through the excavation in 1972 (Table LI).

Table LI. Ageröd I:D. Distribution in types of narrow micro-burins.

Type						
Aa	Ab	Ba	Bb	Fa	Fb	Σ
21	2	5	3	10	3	44

In relation to the narrow microliths, they amount to 40%, and if the failures are deducted, to 28%. As mentioned previously, this lack of agreement is in all likelihood caused by the way the excavation was conducted. Section D was excavated more meticulously and carefully, a fact which is also indicated by the relatively large number of finds found on re-examination. The smallest find thus recovered, for instance, measured no more than 0.4 cm. The distance between the base and the point of fracture or intended fracture was measured on micro-burins of types Aa, Ab, Fa and Fb (Fig. 76). It emerges that there are two groups according to length.

Only one micro-burin was distinguished as being clearly intended to produce broad microliths - broad micro-burin. The specimen, which is of type Ab, is 2.2 cm long and 1.5 cm wide. In contrast to the norm, retouching on this example was done by pressure oriented against the dorsal face of the blade. The facet, almost at right angles to the long axis of the blade, is on that side too.

9.5. Flake scrapers

There are 7 flake scrapers. Five examples belong to type 1 and two items to type 2. Their variation in size is considerable, as may be seen in fig. 77. The difference in thickness - the values are 0.3 cm and 1.4 cm with a mean of 0.8 cm - is also considerable. The forms represented have oval, triangular and round contours. One of the scrapers is especially evenly and symmetrical trimmed. Two flake scrapers are in a fragmentary state. One of these consists of two parts encountered in the same m². The other fragmentary scraper was retouched along both long sides; one retouch was done before a deformation of the item occurred; the other, after. The angle of retouch varies between 70° and 50° with a mean of 65°

9.6. Blades with end retouch

According to the criteria stated for distinguishing blade scrapers and blade knives, the find material contains 8 blade scrapers and 4 blade knives.

Three blade scrapers show the proportional relation of blades, while the remaining 5 are blade fragments. Only one scraper, a fragment, has scraped retouch at right angles to the long axis. In contrast to the

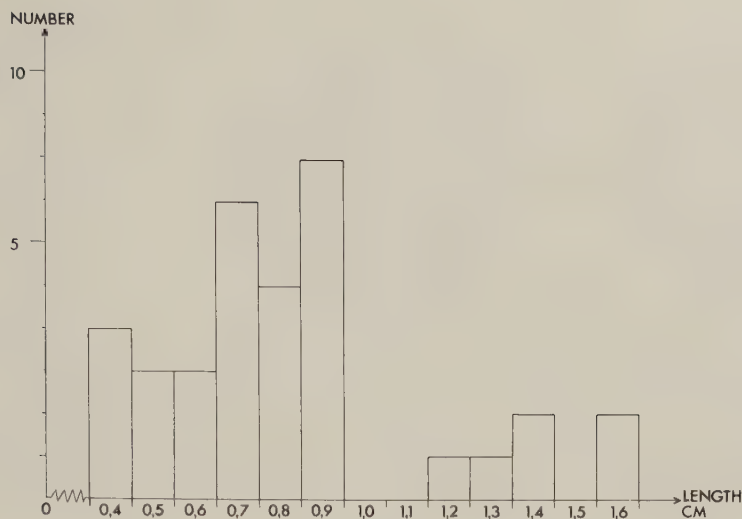


Fig. 76. Ageröd I:D. Distribution of length of narrow micro-burins.

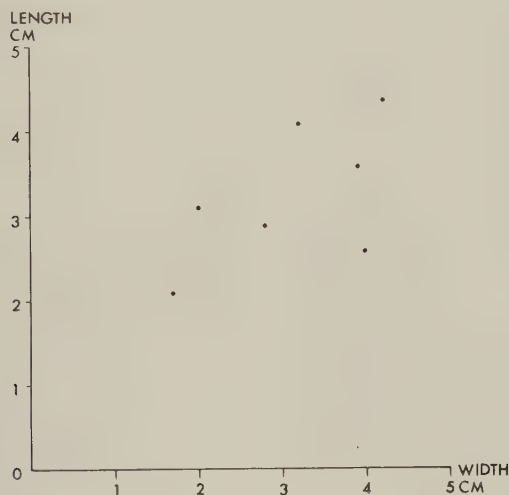


Fig. 77. Ageröd I:D. Length-width correlation of flake-scrapers.

other scrapers, its edge is shaped concavely. The rest have straight scraping edges. The variation in angle of the obliquely retouched items covers the whole scale accepted for blade scrapers. Seven scrapers are of type 1 and only one belongs to type 2. This latter item exhibits bifacial frictional retouch on one of its long edges.

Two of the four blade knives are intact. The other two are fragmentary. Only one knife has retouch along more than half of the back. All knives have clearly noticeable frictional retouch along their cutting edge.

9.7. Burins and burin spalls

A total of 16 burins was found at site D. The primary material of these were; blades: 5, blade fragments: 4, bulbar flakes: 2, and flakes: 5. One example is a centre burin, the others are angle burins, distributed as in table LII.

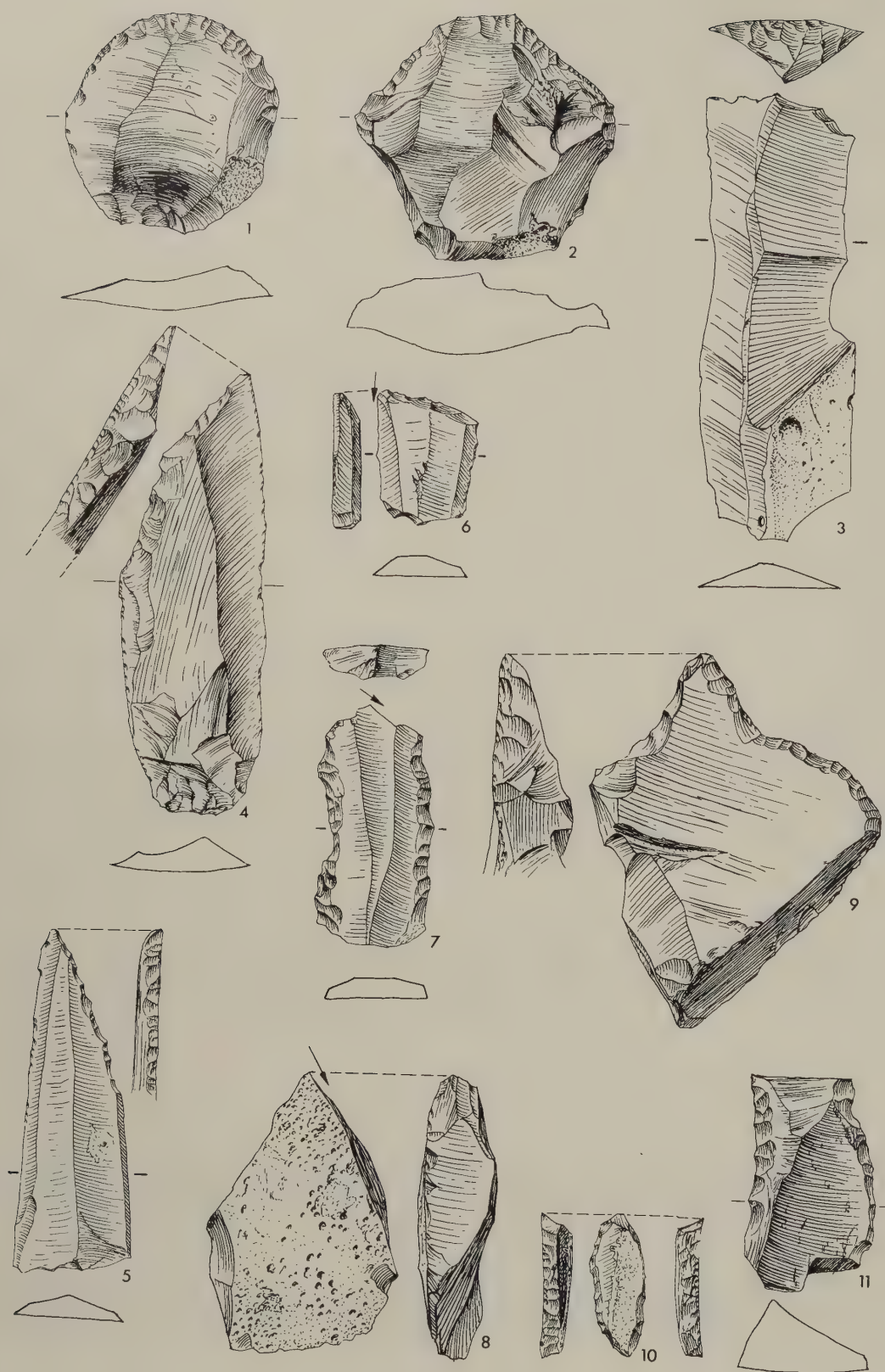


Fig. 78. Ageröd I:D. Flake scrapers (1-2), blade scraper (3), blade knives (4-5), burins (6-8), borers (9-10) and strike-a-light (11). 1-2: type 1, 3: type 1b, 4-5: type 1, 6 and 8: type 2Ia, 7: type 1, 9: type 3b, 10: type 3a. 1:1.

Table LII. Ageröd I:D. Distribution in types of angle burins.

Type	Sharpening of cutting edge				Number of cutting edges
	a	b	c	d	
2 I	8	1	1	1	11
2 II	2				4
3 II	1 1/2	1/2			4
Σ	10 1/2	1 1/2	1	1	19

Only type 2 I is represented by all variants of sharpening of cutting edge. One 3 II type burin has two diagonal edges, and one of the edges is produced by a single stroke, while the other shows traces of secondary trimming. Three of the type 2 I burins have platforms made by retouching. Three other examples have frictional retouch, although as indicated by its position, not necessarily in connection with the use of the piece of flint as a burin. One of them is the centre burin made from a blade whose both sides show retouch typical of strike-a-lights. The total of 20 burin edges have the widths as in table LIII.

Table LIII. Ageröd I:D. Distribution of width of burin edges.

Width	0.1 cm	0.2 cm	0.3 cm	0.4 cm	0.5 cm	0.6 cm
Number	1	6	7	3	2	1

Four flints are considered detached burin spalls derived from burin production. One of the spalls bears traces of a previous burin edge. Thus, there are 5 negative edges; 2 are 0.3 cm wide, 2 are 0.4 cm wide, 1 is 0.7 cm wide. Unfortunately none of the spalls can be fitted to any of the preserved burins. Although the site was practically totally investigated, nor more spalls were found, probably due to their small size. Only four of the burins from Section D had facets longer than 1.5 cm.

9.8. Borers

Two of the borers were made from flakes and two from blade fragments. The two made from flakes have a marked shoulder between handle and point. The points are trimmed by retouch in one direction and are parallel to the long axis of the flints. One flake borer has edge retouch along one entire long side. The two borers made from blade fragments also have pronounced shoulders. The point of one of the borers is parallel to the long axis. The other borer is a quadrangular flint and the point, partly broken, is on one of the corners.

9.9. Rectangular artefacts

Fourteen of the blade fragments were classified as rectangular artefacts. According to the position of retouch, they can be classified as in table LIV.

Table LIV. Ageröd I:D. Distribution in variants of rectangular artefacts.

	Number of retouched corners			Σ
	2	3	4	
Two sides retouched	3	1		4
Three sides retouched		4	2	6
Four sides retouched		2	2	4
Σ	3	7	4	14

The frictional retouch is most pronounced on items provided with four corners. Frictional retouch is present even on the sides made by breaking the blade. On these sides the frictional retouch was created by scraping a hard material. One rectangular artefact has a burin edge.

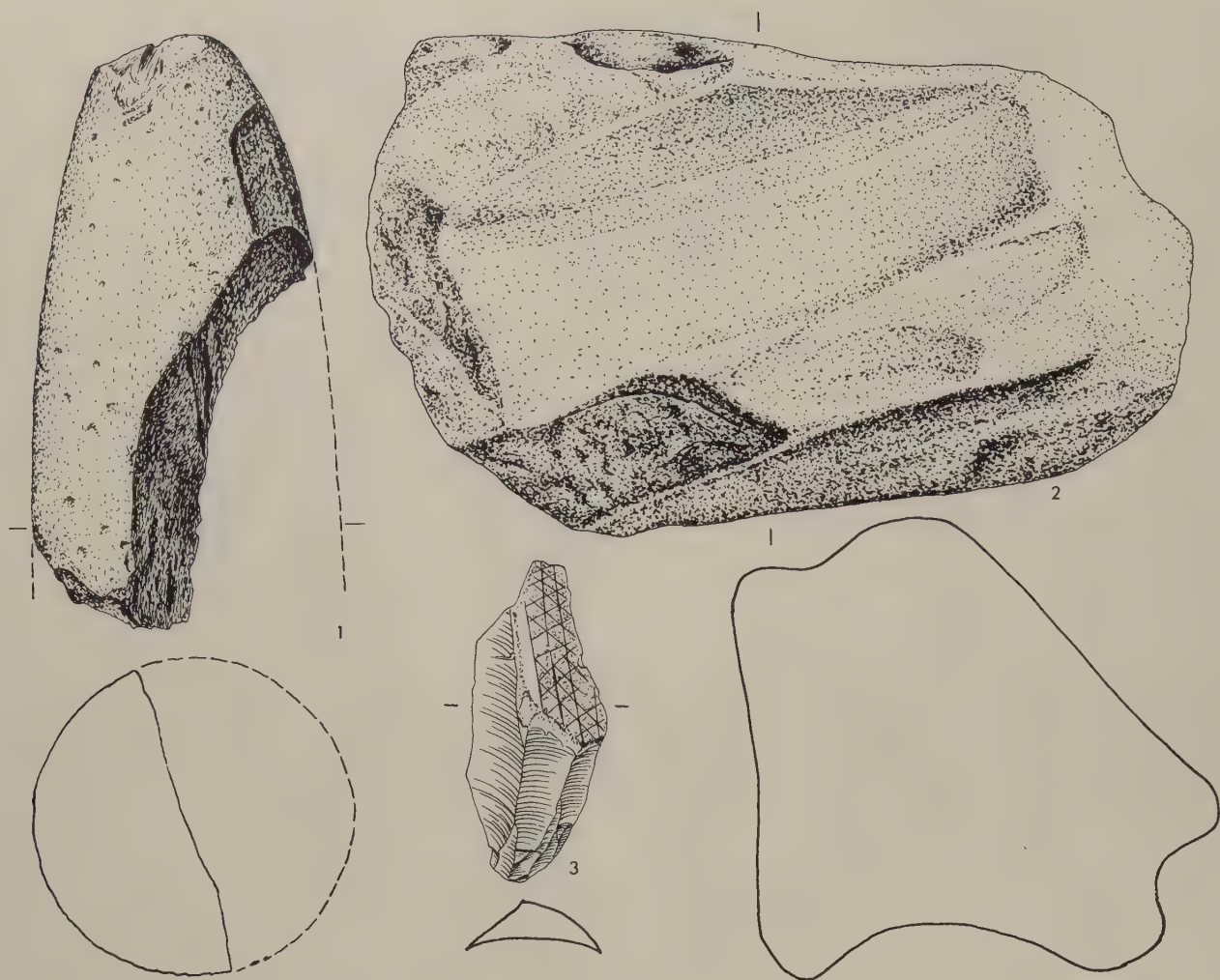


Fig. 79. Ageröd I:D. Fragment of a round pecked stone axe (1), grindingstone (2) and a bulbar flake with incisions (3). 1:1.

9.10. Axes

Only one core axe derives from Section D. The fragmentary axe, with the butt preserved, is of type 4 and its length is 6.4 cm, its width 4.0 cm. Judging by the traces of flaking, the axe was probably used secondarily as a core for flaking.

One fragment of the butt of a stone axe of basalt was found. Its length is 8.0 cm. The cross-section had been circular, measuring 4.2 cm in diameter. The surface is smoothed by grinding, but this has not entirely eliminated the unevenness of the pecked surface. These observations must indicate that the axe was a round pecked axe. The direction of striking flakes running lengthwise on the lower part of the axe fragment may indicate that the implement was utilized even in its fragmentary state.

9.11. Hammerstones

There are three intact hammerstones made of flint and six fragments of such, as well as one intact hammerstone of sandstone. One of the hammerstones of flint was probably primarily utilized as a multi-platformed core, and one certainly was a flake core. The third intact hammerstone is a piece of unworked morain flint. More than half of the total surface of the first mentioned hammerstone is covered by marks left by battering. On the two other hammerstones, such marks are concentrated to a smaller area. The hammerstone of sandstone also has a restricted battered area. The relatively brittle material may indicate that this hammerstone was used as a retoucheur.

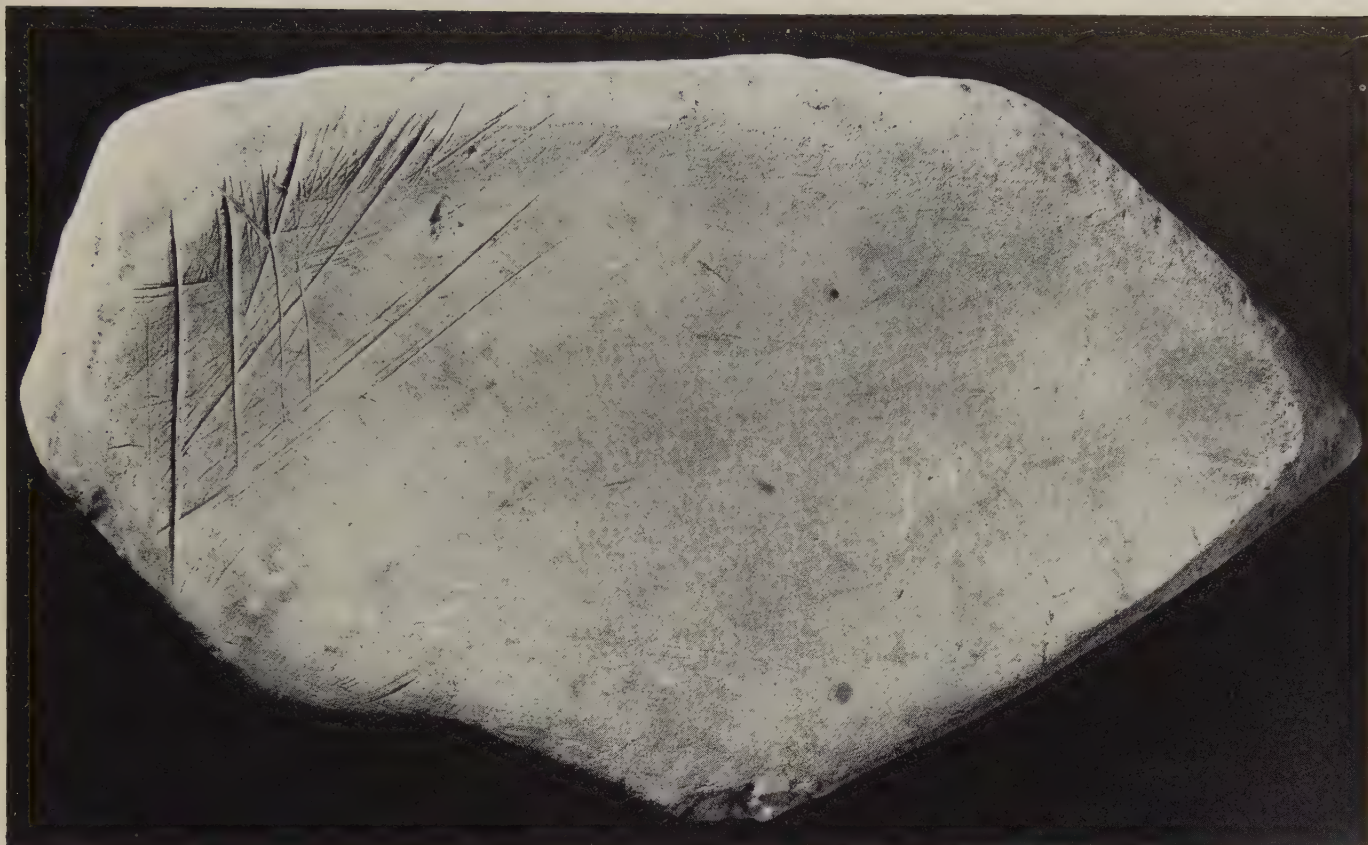


Fig. 80. Ageröd I:D. Grindingstone with grooves. 1:2.

9.12. Grindstones

There are 5 grindstones, of which three may be described as intact. The largest intact grindstone is 40.2 cm long and 21.5 cm wide. All three are of soft sandstone. The largest one has a grinding surface which covers one whole broad side and is slightly concave and very smooth and even (Fig. 80). One end of the grinding stone has narrow and deep grooves, probably made by grinding some pointed bone object. The opposite broad side bears a few separate incisions in asymmetrical position. Only the fragments exhibit completely plane grinding surfaces. The smallest specimen which is intact and measures 11.4 cm in length has no less than six grinding surfaces (Fig. 79:2). They vary from being slightly concave to pronouncedly U-shaped. The width of the grinding surfaces varies from 5 cm to 1 cm. It seems likely that several artefacts of various shapes could be ground on this stone.

9.13. Retouched flakes and blades

In Section D the following flint-types with retouch have been identified: bulbar flakes: 32, flakes: 43, blades: 48, blade fragments: 84 and micro-blades: 28. Three blades and one blade fragment have been classified as strike-a-lights. The types of retouch and their distribution follow the same patterns as can be observed on the retouched flints from Section B.¹³⁴

9.14. Flints and sandstone slab with incisions

2 flints, both bulbar flakes are provided with incisions on their calcareous crust. One has two groups of lines crossing each other - pattern 1 -while the incisions on the other flint consist of parallel lines - pattern 2.

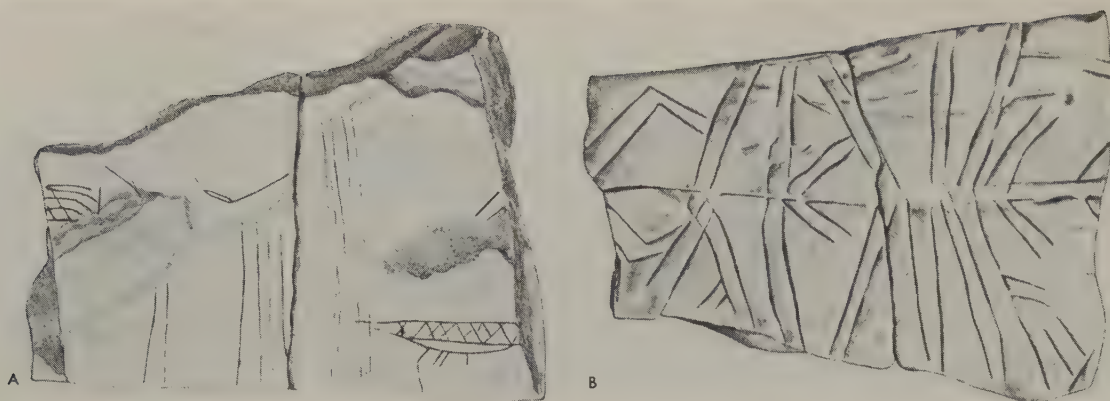


Fig. 81. Ageröd I:D. Fragmentary sandstone slab with incisions. After Althin 1950. 1:2.

While investigating Trench D1, two fragmentary sandstone slabs which could be fitted together were found in the same metre square (y=15). The find position indicates that the slab more likely originates from Section B - not from Section D - since the former lies closest. The 13.5 cm long and 9.8 cm wide fragment constitutes part of a large slab. One whole long side and a minor part of the second long side next to the widest section may be considered to be intact. Thus, the slab must originally have had a considerably more pronounced long and narrow shape than it has now. Both faces of the slab are provided with incisions. These consist on one side of thin, shallow grooves (Fig. 81:A). The wider part on the right shows a cross-hatched figure preserved for a good 4 cm. The lower borderline of the figure is a double line from which four short strokes issue. A couple of centimetres above the figure are traces of two incised lines. Due to weathering, it cannot be seen how the lines were connected. The central part features a number of lines running at right angles to the long axis of the slab. A division into three groups can be distinguished. The group next to the short side consists of two short lines incised up to a marked shoulder in the surface. The same is true regarding the four parallel lines of the central group. The third group consists of at least seven lines, partly converging. On the upper part of the centre part there is a V-shaped incision. In the north-west corner parts of a cross-hatched figure, measuring 1.3 x 0.8 cm are visible.

On the other face of the slab, the incised lines are wider and deeper (Fig. 81:B). From a middle line broader than the rest, pairs of lines spread more or less symmetrically onto both sides. The execution of the incised lines is different on the two faces. The shallow, thin grooves on side A were probably incised with a sharp and slender tool, such as a flint point. The wide, deep grooves on side B were made with an edge of the same width as that of the grooves, i.e. something between 0.05 cm and 0.10 cm. The wide, plane bottom of these grooves suggests that they were made with the help of a burin.

9.15. Artefacts made of antler and bone

Good conditions for preservation of bone resulted in a rich bone material from Section D, including a number of antler and bone artefacts. These are:

Percussion stick of red deer antler tine, found in the fine detritus gyttja underlying the culture layer measuring 15.2 cm in length and 3.3 cm in width (Fig. 82:1). The point is blunt and has wear traces. The part above the point may possibly have been ground. Moreover, there are a few thin grooves of which one looks as if made by a burin. On the base, an approximately one cm wide part bears obvious cut marks, made when detaching the tine from the beam.

Percussion stick of red deer antler tine, strongly curved, found in the culture layer (Fig. 82:2). The shortest distance from point to base measures 19.3 cm, the width 3.0 cm. Short cuts on the tip constitute obvious wear traces of e.g. indirect percussion. A few traces of cuts are documented on the base.

Bone chisel of shaft bone, fragmentary, measuring 5.5 cm in length (Fig. 82:3). The cutting edge, showing wear traces, is 0.8 cm wide. Width and thickness of the chisel are 1.6 cm and 0.7 cm respectively. One face is plane, the other convex. The sides face each other obliquely. The artefact received its final form through grinding, but this did not remove all traces of preliminary working. One of the sides exhibits vague traces of "terracing". The opposite side is uneven, showing negatives of splinters measuring a maximum of 2 cm that were detached from the edge. On the plane ventral face of the chisel there are

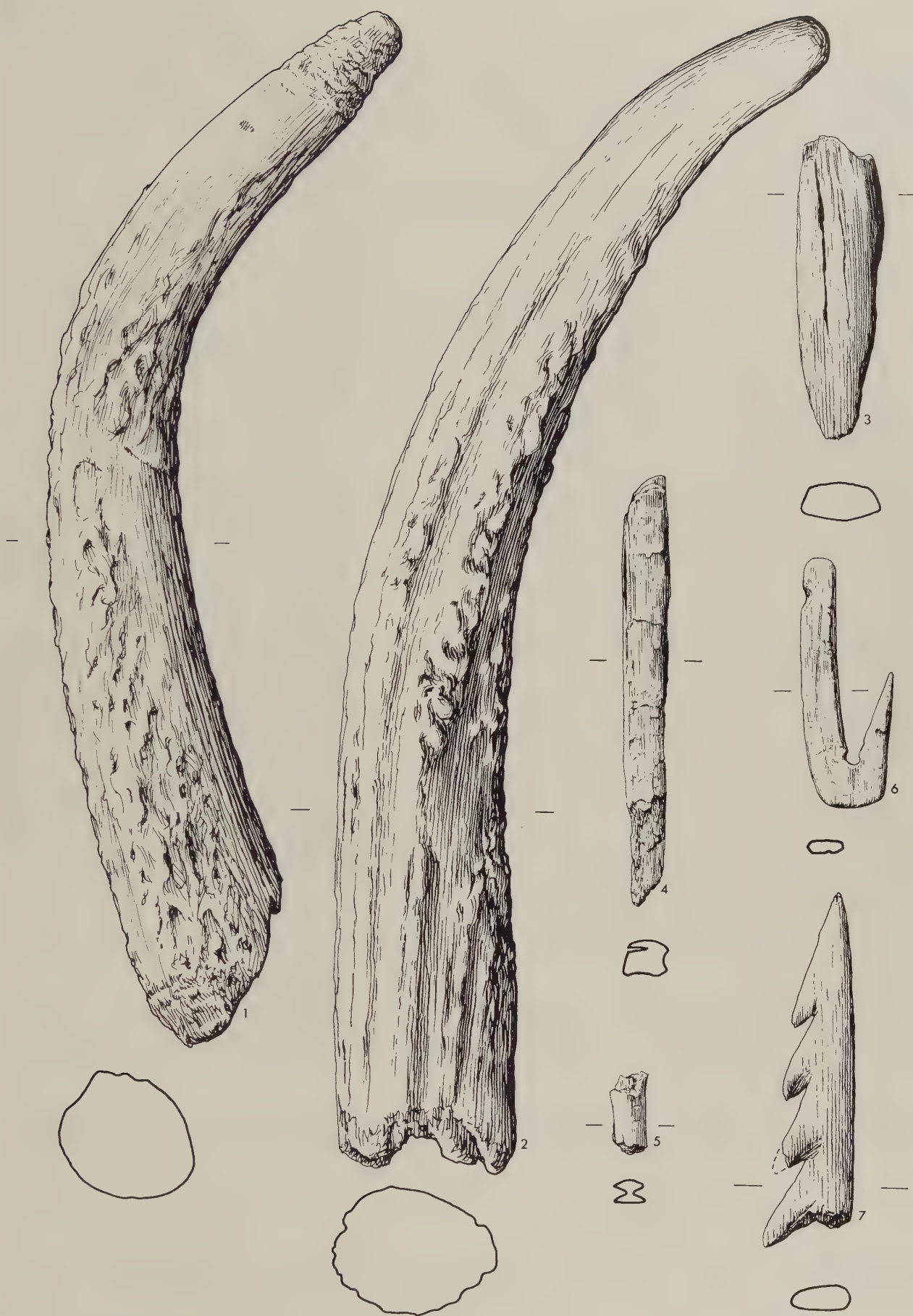


Fig. 82. Ageröd I:D. Artefacts made of antler and bone. 1-2: percussion sticks, 3: chisel, 4: point, 5: slotted bone point, 6: fish-hook and 7: barbed point. 1:1.

a few shallow grooves running the length of the artefact.

Bone point of shaft bone, fragmentary, with fractural surfaces on both the point and the base, 8.9 cm long (Fig. 82:4). The item is square in cross section, the sides measuring 0.8 cm in width. Slight indications of the curved inside of the shaft bone occur. On one side there are traces of splitting the bone with the aid of a tool that has cut 0.5 cm into the shaft bone before breaking off part of it. The opposite side is evenly ground.

Bone point of shaft bone, 7.5 cm long, the base is broken off. The sides are evenly ground; the faces, one concave and one convex, preserve the natural shape of the bone. Width and thickness are 1.0 cm and 0.9 cm respectively. One face of the bone point bears traces of two shallow 0.1 cm wide grooves running lengthwise.

Axe socket of red deer antler, found while stripping for the main Trench B through Section D (Fig. 83:1). The fragmentary item was originally 18.5 cm long, and is oval in cross-section measuring 6.3 x 5.3 cm. The object has a shaft-hole oriented somewhat obliquely to the long axis. The shaft-hole is circular, 2.5 cm in diameter. One end of the socket was gouged into an oval cavity from which two pairs of opposite grooves were carved in the direction of the shaft-hole, dividing the lower part of the item into four equal prongs. Two of the grooves were cut almost up to the shaft-hole. Only one of the prongs is preserved in its full length. 0.8 cm above the opening a 0.2 cm deep groove was cut into the socket. The item shows traces of a cut-off tine.

Fragment of axe socket made of red deer antler (Fig. 83:2). The fragment consists of two 13.7 cm long pieces deriving from the lower part of the artefact. Both bear traces of cuts along the edges cutting through the compact outer surface of the antler. One of the fragments bears traces of the shaft-hole. Near their tip, both fragments exhibit a groove running transversely to the long axis. On one, the groove extends over the whole width of the fragment; on the other, a secondary damage interrupts the groove which on one half of the fragment has three additional short grooves.

Slotted bone point found in the culture layer (Fig. 82:5). The 1.4 cm long fragment, damaged by fire, is 0.6 cm wide and 0.5 cm thick. It has two 0.2 cm deep and 0.2 cm wide grooves cut opposite each other. One face is convex, the other plane.

Fish-hook made of a shaft-bone splinter, 4.6 cm long, 1.7 cm wide and 0.3 cm thick, completely preserved (Fig. 82:6). The end to be fastened is rectangular in cross-section with a width of 0.7 cm. The pointed end has no barb. The outer aspect of the other end has a 0.3 cm wide cut in which the line could be fastened. The item was probably made in the following way: first, a piece of appropriate size was broken off a shaft-bone and ground and evened into the round shape forming the bend of the hook. Then, about 1 cm above its end, a small hole, 0.5 cm in cross-section, was drilled from both sides. The procedure succeeded in perforating the piece of bone at its weakest point without splintering or damaging it. This hole was subsequently widened, and finally both ends were shaped. This description, given by Sarauw, is based on finds of both rough-outs and finished fish-hooks from Mullerup on Zealand.¹³⁵ The above-mentioned fish-hook was probably made in the same manner, except that the hole was smaller, measuring only 0.2 cm in diameter. The narrow aspects of the hook bear traces suggesting that the piece of bone had been removed with the help of a burin and then was ground down.

Barbed point of shaft-bone, fragmentary, 6.5 cm long, 1.7 cm wide and 0.5 cm thick (Fig. 82:7). Four barbs are preserved; the point of one is broken off. The distance between the barbs is uniform - 1.4 cm. The size of the barbs themselves increases the further they get from the point. In between the barbs are obviously cut notches.

A 4.6 cm long and 1.8 cm wide fragment of shaft-bone belonged originally to an artefact with polished surface, probably a knife. Its cross-section was originally a pointed oval, its width more than 2 cm.

9.16. Artefacts made of wood

Due to favourable conditions, primarily in the western part of the settlement, a number of pieces of wood bearing obvious traces of working have been preserved. These are:

Conical object made of alder, roundish-oval, measuring 10.9 cm x 9.2 cm (Fig. 84:1). One aspect is slightly concave, while the other is strongly convex. Its thickness is 2.8 cm. The centre of the object is perforated, the hole getting smaller towards the conical aspect, diminishing from a diameter of 2.4 cm

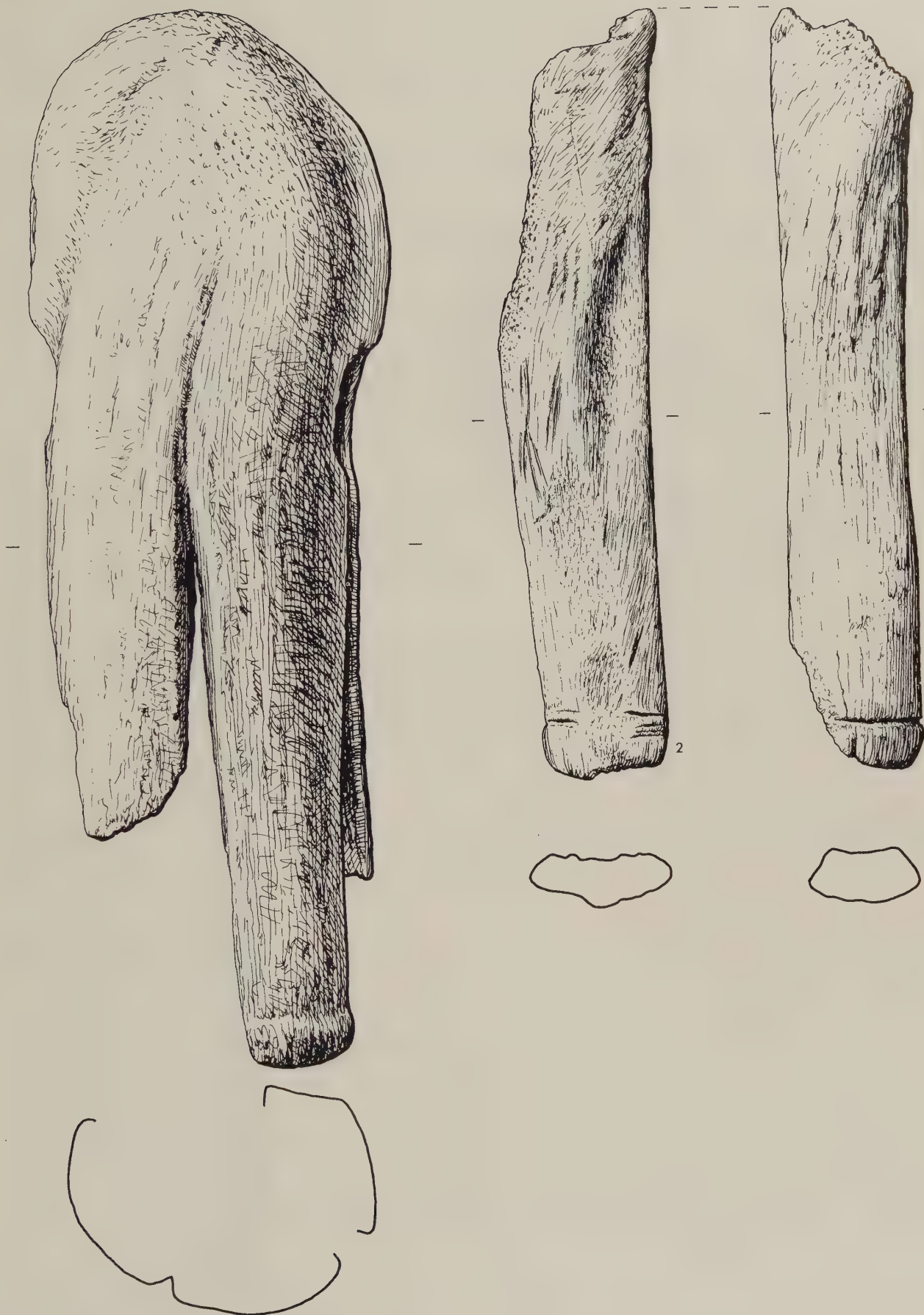


Fig. 83. Ageröd I:D. Axe sockets of red deer antler. 1:1.

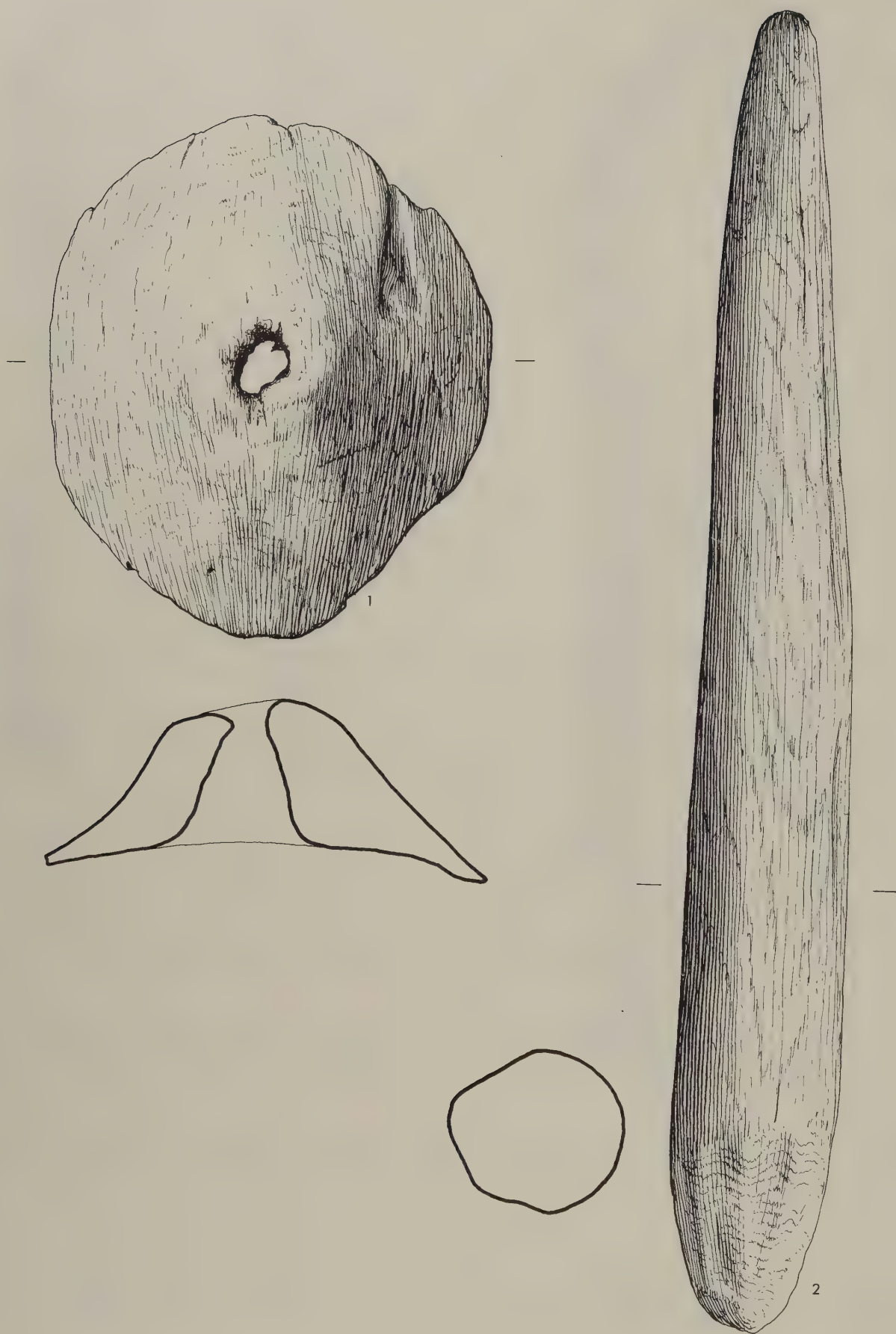


Fig. 84. Ageröd I:D. Artefacts made of wood. 1: conical object made of alder and 2: object made of alder. 5:6.

to 1 cm. Clearly visible cuts or scrapings cannot be documented since they were obliterated by subsequent smoothing.

Object made of alder, fashioned from part of a branch, 27.3 cm long (Fig. 84:2). One end is the thickest part, measuring 3.6 cm in diameter. On this end there are traces of cuts measuring ca 3.6 cm. The other end is smoothed.

Shaft made of ash, 39.5 cm long, its diameter 2.0 cm. Both ends bear traces of having been worked - one end is truncated, the other slightly tapered. Several shoots have been cut off.

Hazel branch, sharpened into a point. The object, consisting of five parts when found, originally measured ca 55 cm in length. The branch is evenly thick, measuring 2.4 cm in diameter. Both ends are worked, one of them blunted through short cuts all around, the other sharpened into a point exhibiting cut marks around half the circumference of the branch.

Alder branch, fragmentary, encountered in two pieces. It is 28.8 cm long, its diameter is 5.4 cm. Traces of sharpening are clearly visible. Several of them are 11 cm long and 1.5 cm wide. The branch had quite likely received its pointed shape when it was ripped off the tree and was then sharpened further.

Alder branch, now consisting of four parts and originally measuring ca 30 cm in length and 2.6 cm in width. The ends exhibit indistinct traces of working.

Fragment of an alder branch, 10.3 cm long, the diameter measuring 3.7 cm. Traces of cutting on one end are preserved around half the circumference.

The most interesting of these artefacts is the conical piece of holed wood. Similar objects have been found at the two settlements Maglelyng and Holmegaard on Zealand as well as in North Germany and Estonia.¹³⁶ Ethnological analogies suggest that these objects, fastened on a pole, served as a device to disturb the water and thereby scare the fish into nets or bow-nets. They may also have been used as fittings on poles for propelling a vessel in shallow water with soft bottom.

Hazelnuts constitute the only plant element documented in Sections B and D that may have been gathered and consumed. Section D yielded a considerable amount of hazelnut shells during the 1948 investigation. Similar finds from Section B are much poorer. This may partly be explained by less favourable conditions for preservation of organic matter, diminishing the originally extant number. When carbonized, hazelnut shells are very resistant to decomposition, as documented by the large amount of shells in settlement D. Had nut-gathering been an important means of subsistence within Section B, the number of carbonized nut shells should have been much higher than what is documented.

In the artefact-producing layer surrounding the culture layer of Section D several fragments of tinder were encountered. The largest of these was submitted to conservation. It constitutes one half of a spongy fungus (genus *Fomes*) measuring 15.2 cm in diameter and 8.0 cm in height.

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Table LV. Distribution of artefact types in Ageröd I:B and Ageröd I:D.

Types	Ageröd I:B								Ageröd I:D	Ageröd I:D/ Ageröd I:B
	No.	%	No.	%	No.	%	No.	%	No.	
Blade cores (A+B)	9	20.5	33	75.0	2	4.5	44	100.0	2	22:1
Micro-blade cores (C + keeled scrapers	39	23.5	127	76.5	-	-	166	100.0	13	13:1
Flake cores (D)	74	25.3	217	74.3	1	0.3	292	99.9	3	97:1
Flake cores (E)	57	26.3	156	71.9	4	1.8	217	100.0	2	109:1
Rejuvenation flakes (from A, B and D cores)	95	20.3	372	79.7	-	-	467	100.0	21	22:1
Rejuvenation flakes (from C cores)	58	21.4	208	76.8	5	1.8	271	100.0	15	18:1
Narrow microliths	249	16.6	1239	82.5	14	0.9	1502	100.0	110	14:1
(Intact triangles	50	15.1	281	84.6	1	0.3	332	100.0	23	14:1)
(Intact lanceolates	5	16.6	24	80.0	1	3.3	30	99.9	-	-)
(Intact narrow trapezes	11	22.0	37	74.0	2	4.0	50	100.0	2	25:1)
Broad trapezes	18	22.2	62	76.5	1	1.2	81	99.9	9	9:1
Semifacatures of broad trapezes	5	18.5	22	81.5	-	-	27	100.0	3	9:1
Narrow micro-burins	128	16.5	645	82.9	5	0.6	778	100.0	44	18:1
Broad micro-burins	-	-	13	100.0	-	-	13	100.0	1	13:1
Flake-scrapers	28	24.6	85	74.6	1	0.9	114	100.1	7	16:1
Blade-scrapers	23	20.7	88	79.3	-	-	111	100.0	8	14:1
Blade knives	16	20.5	61	78.2	1	1.3	78	100.0	4	20:1
Burins	60	25.5	172	73.2	3	1.3	235	100.0	16	15:1
Burin spalls	8	22.2	28	77.8	-	-	36	100.0	4	9:1
Borers	15	19.2	62	79.5	1	1.3	78	100.0	4	20:1
Rectangular artefacts	58	25.7	164	72.6	4	1.8	226	100.1	14	16:1
Core axes	2	10.5	17	89.5	-	-	19	100.0	1	19:1
Flake axes	-	-	2	100.0	-	-	2	100.0	-	-
Sharpening flakes	2	18.2	9	81.8	-	-	11	100.0	-	-
Stone axes	1	12.5	7	87.5	-	-	8	100.0	1	8:1
Hammerstones	14	15.4	76	83.5	1	1.1	91	100.0	9	10:1
Grindstones	8	20.0	32	80.0	-	-	40	100.0	5	8:1
Retouched bulbar flakes	71	16.9	344	81.9	5	1.2	420	100.0	32	14:1
Retouched flakes	132	17.8	598	80.8	10	1.4	740	100.0	43	17:1
Retouched blades	130	18.8	555	80.1	8	1.2	693	100.1	48	14:1
Retouched blade frag- ments	192	19.0	805	79.7	13	1.3	1010	100.0	84	12:1
Strike-a-lights	13	17.3	61	81.3	1	1.3	75	99.9	4	19:1
Retouched micro-blades	66	18.9	279	79.7	5	1.4	350	100.0	28	13:1
Flints with incisions	9	20.0	36	80.0	-	-	45	100.0	2	23:1
Stone slab with incisions	-	-	-	-	-	-	-	-	1	-
Stone flakes	-	-	9	100.0	-	-	9	100.0	-	-
Blades	933	19.5	3790	79.4	53	1.1	4776	100.0	290	16:1
Blade fragments	1817	18.3	7967	80.5	118	1.2	9902	100.0	437	23:1
Micro-blades	1820	19.3	7495	79.6	99	1.1	9414	100.0	434	22:1
Bulbar flakes	4983	18.0	22413	80.8	338	1.2	27734	100.0	1258	22:1
Flakes	6504	18.8	27765	80.1	398	1.1	34667	100.0	2205	16:1
Ochre	-	-	+	-	-	-	+			
Total	17637		76014		1091		94742		5162	
Polished flint	1	100.0	-	-	-	-	1	100.0		
Pottery	-	-	2	100.0	-	-	2	100.0		
Total	1	33.3	2	66.6	-	-	3	99.9		

	Ageröd I:B						Ageröd I:D		Ageröd IB/ Ageröd ID	
	Layer 1		Layer 2		Layer 3		Total		No.	
No.	%	No.	%	No.	%	No.	%			
Percussion sticks	-	-	-	-	-	-	-	-	2	-
Axe socket	-	-	-	-	-	-	-	-	2	-
Bone chisel	-	-	-	-	-	-	-	-	1	-
Bone points	-	-	1	100.0	-	-	1	100.0	2	0.5:1
Slotted bone points	-	-	7	100.0	-	-	7	100.0	1	7:1
Barbed points	-	-	-	-	-	-	-	-	1	-
Fish-hook	-	-	-	-	-	-	-	-	1	-
Bone knife	-	-	1	100.0	-	-	1	100.0	-	-
Unclassified bone artefact	-	-	1	100.0	-	-	1	100.0	1	1:1
Total	-	-	10	100.0	-	-	10	100.0	11	0.9:1
Resin	-	-	2	100.0	-	-	2	100.0	-	-
Conical object of wood	-	-	-	-	-	-	-	-	1	-
Unclassified object of wood	-	-	-	-	-	-	-	-	1	-
Shaft of wood	-	-	-	-	-	-	-	-	1	-
Worked branches	-	-	-	-	-	-	-	-	4	-
Tinder	-	-	-	-	-	-	-	-	+	-
Total	-	-	2	100.0	-	-	2	100.0	7	0.3:1

V COMPARATIVE STUDIES

10. Central Scania

The greatest problem to be faced when dealing with find materials from Ageröd I:B and Ageröd I:D is deciding whether they are chronologically homogeneous or heterogeneous. The answer to this question must be based on results of various analyses. Inter-disciplinary contributions complementing the archaeological treatment are likewise of eminent importance.

The first step to be taken in this analytical complex will be an internal survey of the artefact and waste-product assemblages of both settlement sites. Its aim is to record documentable deviations within artefact groups. This will be followed by a comparative study of Ageröd I:B and Ageröd I:D so as to point up similarities and differences which, viewed in a wider context, may be expected to attain enough significance for further analysis.

The next step will be a comparison between the two materials with regard to both their temporal and spatial relationship to each other. This necessarily includes the study of the rest of settlement sites within the settlement complex Ageröd I.

The comparative study will not deal with every previously recorded type of artefact, but rather concentrate on those types that the author or others have regarded chronologically or chorologically significant. Thus, the great number of microliths will be the most important element. At this juncture interdisciplinary methods such as C 14 dating and certain pollen-analyses will also be accounted for. Moreover, these analyses could not be considered satisfactory for a thoroughly detailed treatment if Danish materials of the Late Maglemose Culture were not included. One important point is the diffusion pattern of certain types of artefacts which are sparsely represented in the traditional South Scandinavian cultural sphere. To throw light on this problem, it must be seen in a wider, continental perspective.

Thereafter, the analysis will continue on a socio-ecological level, taking into consideration such aspects as the number of settlement surface units, size of population and pattern of settlement. Not before these factors are comprehended can a final evaluation be advanced, and this in turn will serve as a basis for the final argumentation on whether the intermediate stage of the Mesolithic represents continuity or discontinuity.

10.1. Ageröd I:B

This chapter is not primarily concerned with taking a standpoint on whether there are decisive proofs for or against homogeneity in the find material of Section B. Rather, the main purpose in comparing artefact types is to point out existing differences and to relate certain factors that might contribute to bringing about differences without their having to be of chronological nature.

Section B contains three types of narrow microliths, triangles, lanceolates and narrow trapezes. The previously mentioned depot seems to demonstrate that at some time during settlement these three types were simultaneously in use. This, however, does not prove that each type was in use for the same duration. Differences in proportion and the distribution of retouch within each type must also be subjected to study. It might be important to consider whether there are deviations within a given type. Perhaps the most salient feature is the heterogeneous nature in length and width of lanceolate microliths (Fig. 34). Here, a bipartition in the material can be traced. The largest group includes the slender examples, while a minor number are broader and also longer. When these latter lanceolates are studied in detail, it will also be evident that they are manufactured from thicker micro-blades. Retouch, too, is more robust and struck at a less acute angle than on the rest of the items (Fig. 35:38). In point of fact, the coarser lanceolate design would fit better in an older microlith context.

Various types of trapezes have also to be treated, primarily with regard to the mutual relationship of the two most numerous forms, types 4 and 5. The relationship of various types of narrow microliths may also be decisive for a chronological evaluation. The percentages of various types of narrow and broad microliths have been thoroughly examined in the preceding report on artefacts. The distribution of these main types will form a foundation for chronological evaluation following the study of other settlement material. Relations between the two types of microliths may also be worth while examining closely. Both types can have functioned as arrowheads. It is therefore important to note the absence of broad trapezes in the previously described microlith depot. It should be noted that this division might be viewed as chronologi-

cally conditioned.

Another difference which may also have chronological significance is the occurrence of conical micro-blade cores, although these constitute a very small percentage of the total number of micro-blade cores.

A comparison of types in the three layers of Section B could also raise interesting questions. In comparing examples of the same type, and various layers with each other, the primary question to be raised is whether the material is chronologically homogeneous or not. In point of fact, there are certain observations indicating that the material from Section B might represent more than one settlement phase. This refers to the flint distribution in the trench which was dug in 1972, running parallel to the previously led main Trench B (Fig. 22). Here, most of the flints lay on a level which was dated to the transition between the Boreal and Atlantic periods, but there were also a few flints close to the bottom zone. These are said to belong to the Late Boreal period.¹ Similarly, the subdivision observed in some spots of layer 2 might also be indicative of a difference in time (Chapter 6.1).

The chapter dealing with find stratigraphy advanced a hypothesis on how the various find-producing horizons 1-3 had been deposited (Chapter 6.2). The proffered explanation was that finds in layer 1 derived from a culture layer originally situated close to the banktop and eroded gradually until it ultimately covered those sections of the same culture layer that were situated at the bottom of the bank. Thus, layer 1 and layer 2 would have been deposited at the same time. This hypothesis was corroborated by certain observations in the field and by analyses of the mineral contents of the layers. Were this hypothesis correct, the admixture of artefacts from different periods should be approximately the same in both layers. This chain of thought led to the way in which the artefacts were accounted for.

In the introductory presentation of each type, the position of each individual sample in relation to the three layers was recorded. In the subsequent discussion, however, the type as a whole was described. This procedure enables the researcher to observe conceivably emerging particular groups. Next, it can be determined to which layer the deviating examples belong, and whether the deviation in question is connected with a certain layer or not.

Table LV records the artefacts of the three layers and the percentage of each artefact type. The number of artefacts in layer 3 is too insignificant for any detailed analysis. No artefacts were found in this layer that were different from the types found in the other layers. Percentages of the various artefact types in layer 1 show perceptible differences: 10.5-100% as related to the total number of examples of each respective artefact type. The percentage of blades and waste products like bulbar flakes and flakes is to a certain extent a value indicator of distribution in each layer. In layer 1, it is 19%, in layer 2, 80% and in layer 3, 1%. Lowest percentages in layer 1 are shown by those artefact groups which in total are represented by only a few examples, such as flint and stone axes. Narrow microliths have percentages below 19%. Burins and rectangular artefacts respectively amount to more than 25%. The debris of production also exhibits some obvious differences in percentage. Narrow microliths have a low percentage in layer 1, while the opposite is true of blade cores and flake cores.

When examining the numerical proportions of microliths, some interesting facts emerge. There are no essential differences between the layers with respect to the total percentage of narrow microliths, 17% and 83% respectively, and the percentage of intact microliths, namely 16% and 83% respectively. This can be interpreted as an indication that fragmentation was the same in layer 1 as in layer 2. Possibly existing differences are therefore not explained by assuming that one layer was more exposed to external effects than the other. That small-sized artefact types, for instance narrow microliths and micro-burins, are represented by low percentages in layer 1 may be due to the fact that identification in the "gravelly" layer - layer 1 - was more difficult than in the culture layer - layer 2 - which contained more organo-gene components. Of other types with a relatively high numerical proportion, only the borers decrease somewhat in frequency in layer 1. Analogously to the above-mentioned, this may be explained by the fact that half of the borers are micro-blade borers.

Following this same principle of selection, some interesting differences in the proportions of various types of narrow microliths emerge, in that narrow trapezes show a high percentage both in layer 1 and layer 3.

Types that show striking deviations from the norm in the distribution of flakes and waste products will have to be given particular consideration during further treatment. Divergencies may have chronological significance, but other factors must also be examined, e.g., artefact distribution within the settlement area. Where it is possible to trace a tendency towards concentrations of individual types, this may suggest an explanation of why their proportional frequency varies. To give an example, a certain artefact type may originally have been concentrated in that area of Section B which was eroded so that these artefacts ultimately were deposited in a secondary position and thus are registered in layer 1. This problem has much too often been neglected in previous works on the subject. The present study will devote a special chapter to it (Chapter 21.1).

Before starting the correlation between Sections B and D, another question must be settled, namely, whether there are any indications that even Section D could include more than one temporally divorced settlement. During the investigation, a percussion stick was found underneath the culture layer. Stratigraphically seen, certain peripheral parts of the settlement indicate more than one find-producing layer (Chapter 7.2). Such a subdivision may be due to a real difference in time, or be the result of a secondary disturbance. The author has proposed the latter as the most likely alternative. Unfortunately there are no artefacts which could be used for correlation purposes, although some items among the microliths are divergent from the rest - the isosceles triangle and the two broad and long lanceolates (Fig. 74:12 and Fig. 74:20). They were, on the other hand, found in the culture layer proper.

In directly comparing types of Sections B and D, proportions of the two materials were given in table LV. The procedure was judged by the author to be more suitable than, for instance, illustrating proportions in a cumulative diagram. The reason for this can be readily seen by taking the proportion in relation to the total amount of flints as a basis. The relationship is 1:18. The relation between the total amount of the two sites can then be set off against the individual types. Striking differences in proportion become evident between Section B on the one hand and Section D on the other. Most underrepresented are cores of types D and E. As mentioned previously, this is probably due to the fact that these types of core were utilized to a higher degree in Section D than in Section B (Chapter 9.2). Blade cores are better represented, and core rejuvenation flakes do not differ essentially. It is also worthwhile noting the distribution of core rejuvenation flakes removed from flake and blade cores respectively in the two sections. The proportion of the former category is 1:20, and of the latter 1:33. In other words, Section D contains relatively seen the same proportion of core rejuvenation flakes removed from flake cores as Section B, although the percentage of flake cores is lower. This suggests that knappers have utilized the same proportion of flake cores in both sections, but that in Section D the cores were ultimately re-dressed for some other purpose, or were removed from the settlement.

Artefact types not essentially deviating from the basic proportion 1:18 are borers and blade knives. The narrow microliths, burins, blade scrapers, flake scrapers and rectangular artefacts are over-represented. Remarkably different proportions are shown by micro-blade cores, broad trapezes, hammerstones and grindstones. The first two types are also more homogeneous in Section D than in Section B. The handle-core is the only type of micro-blade core occurring. Broad trapezes are represented solely by type 4. It has to be noted that in Section B another four types of broad trapezes occur. The over-representation of hammerstones and grindstones probably indicates different activities rather than chronological separation. Some groups of retouched flints as bulbar flakes, blades, blade fragments and micro-blades show striking differences in proportion.

Differences and similarities within the largest group of artefacts - the narrow microliths - are recorded in tables LVII, LVIII and LX. The only type that is not represented in both materials is the segment, but its proportion in Section B is negligible. Section D contains no intact lanceolates but, as mentioned previously, three fragmentary examples were documented. Due to the fact that there is a considerable difference between the total number of examples, the evaluation of divergence in frequency will be quite uncertain. Nonetheless, seen in relation to Section B, Section D appears to contain slightly more triangles but fewer lanceolates and narrow trapezes. A division according to the placement of retouch on triangle microliths - table LVIII - will show that the percentage of examples retouched on the shortest side only - aI - is almost the same in the two assemblages. Type aII reflects the most pronounced difference, since its percentage in Section D is almost 19% higher than in Section B. On the other hand, triangle microliths with a partially retouched side C occur more often in Section B than in Section D. The latter has no triangles with retouch on side B. Table LX illustrates the division of triangles according to types, showing certain deviations. It can be seen that Section D contains a relatively large number of long and narrow microliths. The extremely elongated type 5 has for instance an almost twice as large proportion as in Section B. But the most salient difference is the proportion of type 3, represented by less than half the percentage than in Section B. Proceeding according to Welinder's system will show that the proportion of triangles having a low percentage of l_1 is larger in Section D. But the percentage of Svaerdborg triangles is about the same, namely 80% in Section B and 83% in Section D. Expressed in other words, the percentage of long and narrow triangles not exceeding 0.5 cm in width is, on the whole, the same in both sites.

In the chapters dealing with stratigraphy in Sections B and D, even pollen-analyses were touched upon, although mainly in connection with internal stratigraphic sequence. Apart from Nilsson's analyses there is one more analysis from Section B, but it was made explicitly with the intention of being able to study the process of overgrowth during settlement more in detail (Fig. 14). This analysis is also in accordance with those mentioned previously. On the basis of three analyses from Section B and seven from the settlement within Section D, both settlements are dated to an early part of AT 1 and connected to the boundary

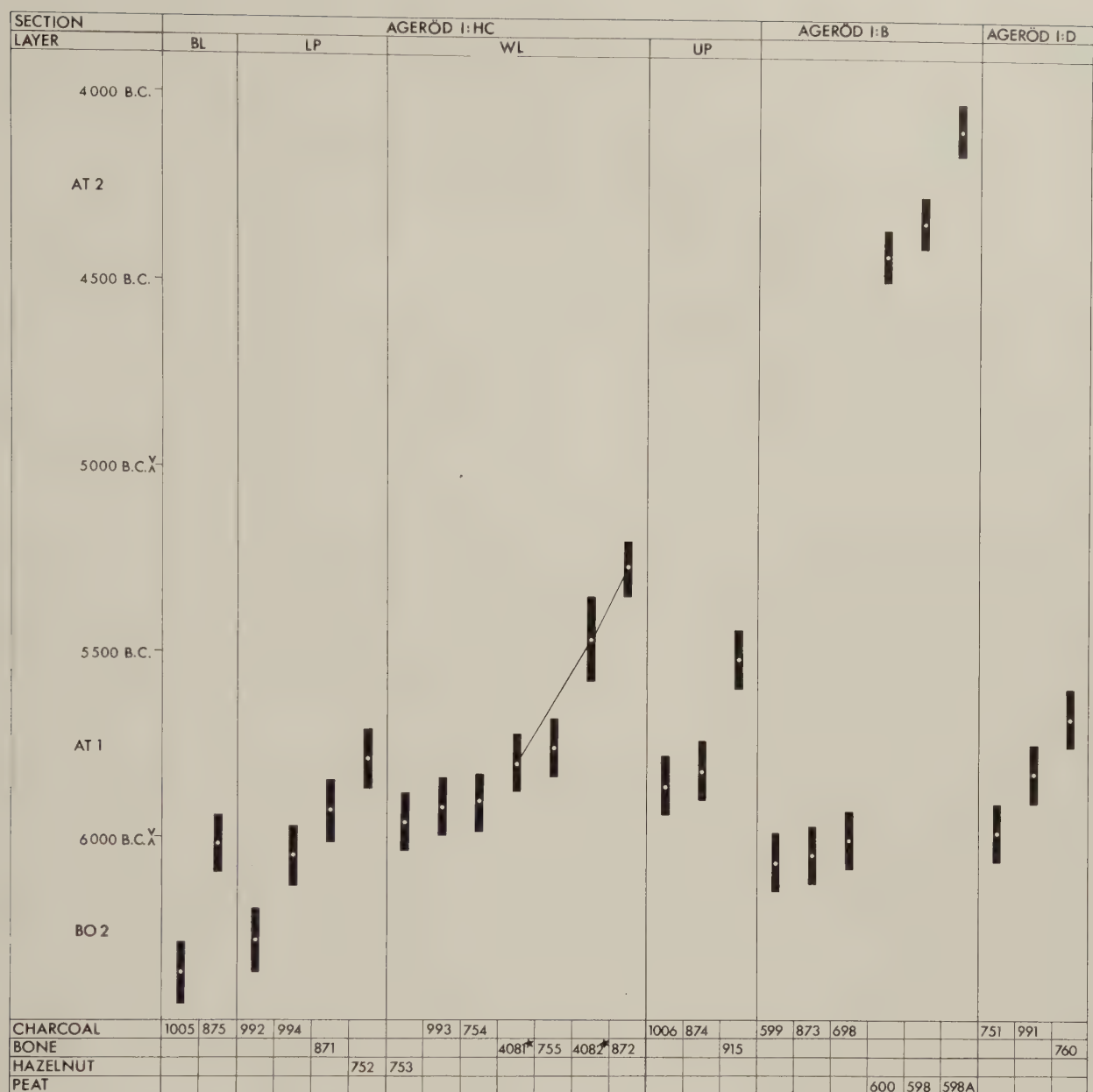


Fig. 85. C 14 datings from Ageröd I. The numbers of datings marked with an asterisk are U-numbers (Uppsala) while the rest are Lu-numbers (Lund). Datings of samples from the same bone are connected with a line.

BO 2/AT 1.² It is impossible to chronologically differentiate the two find localities by pollen-analytical method.³

Out of the ten radiometric datings taken from Ageröd I:B and Ageröd I:D, seven derive from Section B and three from Section D. The results are represented in table LVI and fig. 85, with the standard deviation of 1 sigma. The table also records the manner in which the samples were prepared, since the various methods may to a certain degree influence the results. A milder than normal preparation increases the risk of not being able to completely eliminate mixed-in younger matter, usually humus, from the sample and thus getting younger dates.⁴

Table LVI. C 14 datings from Ageröd I:B and Ageröd I:D.

Section	Sample	B. P.	b. c.	Material	Treatment
B	Lu-599	8020±80	6070	Charcoal	Normal preparation
B	Lu-873	8000±80	6050	Charcoal	Normal preparation
B	Lu-698	7960±80	6010	Charcoal	Normal preparation
B	Lu-600	6380±70	4430	Drift peat	Preparation with HCL
B	Lu-598	6290±70	4340	Drift peat	Normal preparation
B	Lu-598A	6040±70	4090	Humus	NaOH solution obtained from preparation of drift peat
B	Lu-601	3930±60	1980	Wood	Preparation with NaOH
D	Lu-751	7940±80	5990	Charcoal of Pinus	Normal preparation
D	Lu-991	7780±80	5830	Charcoal of Alnus and Corylus	Mild preparation
D	Lu-760	7680±80	5680	Jaw of Sus scrofa	Preparation of collagen with 0.5% NaOH at room temperature

The samples from Ageröd I:B can be divided into three groups according to both their material and resulting dates. The three charcoal samples Lu-599, Lu-698 and Lu-873 have determinations well in accordance with the 60-year variation range between the central values. All three samples derive from the refuse area of layer 2, where larger pieces of charcoal could be gathered. As may be seen from the information on coordinates, two of the samples derive from two adjacent metre squares. The difference between them is that Lu-873 is charcoal from the central part of the layer, while the charcoal for Lu-698 was taken from its lowermost part. The sample Lu-599 was taken 8 m east of the first two, and derives from the central part of the refuse layer.

Samples Lu-598, Lu-598 A and Lu-600, consisting of drift peat or humus extracted from drift peat, form the second group with a variation range of 340 years from the central values. The interval of time between the youngest charcoal sample and the oldest drift peat sample amounts to well over 1500 years. The drift peat was taken from the mid-part - Lu-600 - and upper part - Lu-598 - of the refuse layer. The difference in level between the points where charcoal and drift peat samples respectively were taken never exceeds 5 cm, and in fact three of the samples were taken from exactly the same level. Therefore, the difference in time seems to be connected with the substance of the samples. The porous drift peat most likely contained more drifted down humus, as can be seen from the humus sample Lu-598 A, while charcoal embedded on the same level was more resistant to penetration.⁵

Lu-601 represents the third kind of sample, being completely different from the rest. It derives from a branch found in the refuse layer, but due to the fragmentary state of the object the possibility of its being part of a root should not be excluded.

The samples taken from Ageröd I:D do not show similarly striking differences. The mean of the central values of the three determinations is 5833 with a variation range of 310 years. Preparation may have had some influence on sample Lu-991. For even though pine will grow much older than both alder and hazel, in this particular instance the choice of wood could hardly have influenced dating. The pieces of charcoal bears traces of annual growth-rings small in diameter, meaning that it is part of a branch or the stem of a small tree. In the certificate of sample Lu-760 S. Håkanson, chief of the Radiocarbon Dating Laboratory of Lund, attested that during preparation of the collagen, humus could not be extracted completely. The sample consequently may have given a younger age than was expected. Among the samples from Ageröd I:B, the charcoal and the determinations forming the oldest group may be regarded as the most reliable. When these dates are correlated with results of pollen-analyses, the two kinds of data are in good agreement. When C 14 datings from the oldest group of Section B are compared with those from Section D, the difference between the mean values is 210 years, Section D being the younger of the two settlements. The difference is slight enough to consider it as being within the margin of error of the dating method. An evaluation of a conceivable difference of time between the settlements based exclusively on C 14 datings must therefore be judged altogether too unreliable.

10.3. Ageröd I:HC

During the excavations in the late 1940s the western part of Ageröd I was subdivided into sections A, C and E (Fig. 86 and 87). The investigation of the A-section in 1946 came to consist of an only roughly excavated 60 m long trench at right angles to the former beach, and a meticulous plotting of the artefacts'

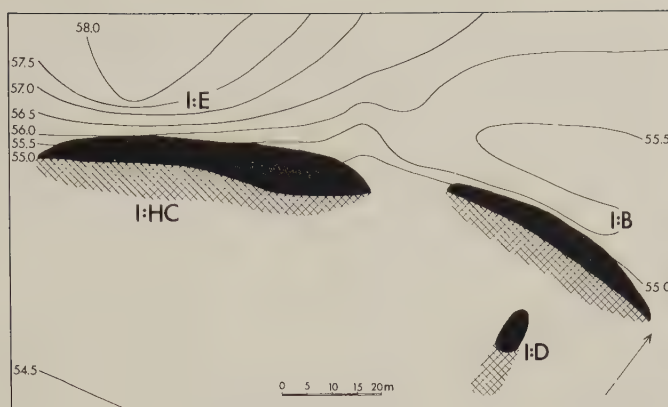


Fig. 86. Distribution of find-producing layers within Ageröd I.

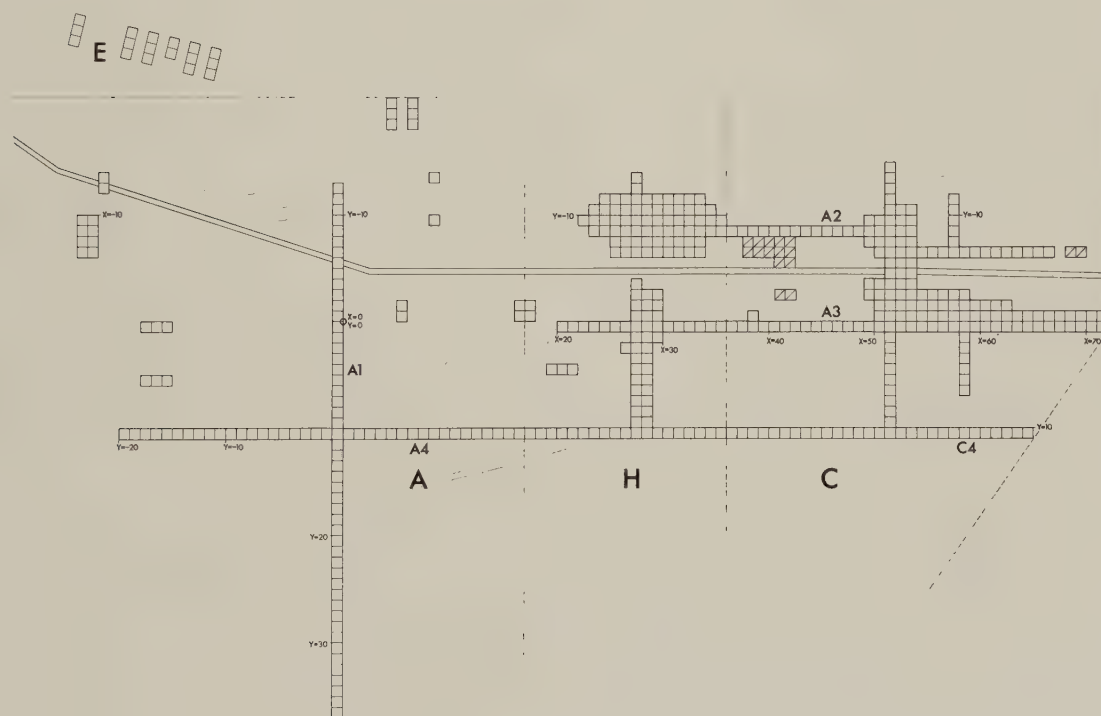


Fig. 87. Ageröd I:HC. Excavated areas. The hatched areas were excavated in 1972-74.

position within a 30 cm wide bench. Since the strata turned out to be poor in artefacts, efforts were concentrated on Section C, where extensive and contiguous surfaces of settlement layers were excavated close to the former shoreline and in the adjacent part. When a surmised hut foundation was excavated, the respective section was labelled H, and consequently the whole area came to be called Ageröd I:HC.

In order to get some notion of the extent of the various artefact-producing layers within this area, another trench running parallel to the former shoreline was also roughly excavated. Such parts that were deemed to have scientific value were subsequently investigated in detail. Within the zone close to the beach three areas were excavated, of which the easternmost consists of two areas connected by a short trench. The mid-area was excavated in 1972-74, when 14 m² were investigated mainly in order to gather organic material for radiometric assays (Fig. 87).

Althin divided the layer sequence into four layers: Bottom Layer (BL), Lower Peat (LP), White Layer (WL) and Upper Peat (UP). The lower part of the latter is also called Culture layer (KL).⁶ Artefacts in BL and LP derive from a settlement within Section E, i.e., the lower parts of a morain ridge above Section HC. Pollen-analytically, the two layers cannot be differentiated.⁷ Nor could the author find out on which premises Althin had based his division, despite the fact that special attention was paid to this problem at the time when the investigation of Section HC was taken up again. No layer division whatsoever was observable.

WL consists of a markedly contrasting zone of minerogen matter of light hue in the otherwise dark-brown layer sequence. This light-coloured layer had been interpreted as artificially created when the water-level of the lake sank and people laid sandstone slabs found in a nearby quarry over the exposed lake bed covered with decayed plants.⁸ A number of sandstone slabs were actually found, but minerogen matter was present in such abundant quantities that it seems questionable whether the whole layer would have been created by human agency. Part of the layer may very well have been formed when this zone constituted the beach and the sinking water level deposited WL.⁹ This WL covers a sector of the former beach measuring at least 65 m in length and ca 7 m in width. When studied closely, it emerges that the extent and thickness of this layer is in no way related to the extent of artefact distribution. Traces of surging could not be found anywhere, hence deposition of older material seems unlikely. The UP layer overlies WL directly. UP received during the investigation several other labels due to various organic admixtures in the layer. But the majority of finds were encountered in a black-coloured layer containing soot and charcoal, covering WL. The rest of the artefacts were found during the excavation of the strongly humified peat which in a diffuse zoning turns into the faintly black-coloured layer containing more artefacts.

No less than 6 major or minor parts of the layer sequence within Ageröd I:HC were pollen-analytically investigated.¹⁰ Secondary disturbance of the layers was documented in one case only, namely in a peripheral part of the investigated area.¹¹ Deposits in the section close to the beach belong to BO 2 and are never older than subzone c, while the outer sections contain examples of deposits from Pre-Boreal times.

BL and LP belong to BO 2. According to Nilsson the date can be put even more precisely to the mid-part of BO 2, but with the reservation that the lowermost part may have been deposited in early BO 2 or late BO 1.¹² A pollen-analysis made later on contradicts this latter reservation.¹³

On the basis of pollen-analysis of an exterior part of WL, it is credibly dated to the Late Boreal period.

Due to severe pollen destruction, no pollen-analysis could be made with material from UP. But on the basis of abundant charcoal occurring in the pollen-analyses taken from its periphery, in Nilsson's opinion the layer should be dated to AT 1 and, to be more exact, to its oldest phase.¹⁴

What has been said so far records the possibilities of optically differentiating between layers UP and WL. These layers are of great importance in a comparative study of Sections B and D, since they meet practically all the requirements desirable in a material for comparison. Particularly important are the chorological premises, since Section HC is adjacent to Sections B and D. According to the pollen-analyses, WL and consequently also BL and LP are older than the settlement in Sections B and D. The same is probably true of UP. In the comparative study BL and LP will only be dealt with in part. Find materials from these layers are so scanty in relation to the other artefact assemblages that a comparison in every detail would be unreliable.

10.4. Ageröd I:B and Ageröd I:D contra Ageröd I:HC

In a comparative study aiming at discerning morphological alterations of artefact types, the narrow microliths, by their number and their variation in form morphemes, manifest themselves as the most important group. In the find material derived from the 1940s investigations, 112 flints from WL and 141 flints from UP satisfy the definition set up for narrow microliths. Microliths found in 1972-74 may be added to these, namely, 39 from WL and 19 from UP; in total there were 151 from WL and 160 from

UP. 53, respectively 73 microliths were undamaged. This means that the intact microliths amount to 35% in WL and 46% in UP respectively. These percentages are exceptionally high compared to the 28% of Section B and 23% of Section D. Nor can the differences be explained by assuming that in Sections B and D a larger percentage of minor flints would have been located. The material resulting from the investigations conducted 1972-74 at Section HC and excavated by the same team who worked previously on Section B displays a degree of fragmentation only slightly deviating from the above given mean values.

Table LVII shows the distribution of narrow microliths. When comparing layers WL and UP, clear-cut variations emerge. The predominant type in both layers is the triangle microlith, but the difference in respective layers still amounts to no less than 14%, WL having the higher percentage. Somewhat less, namely about 12%, is the difference in percentage of narrow trapezes, UP having the higher percentage. The two other types, i. e., lanceolates and segments, show considerably smaller differences. If the figures from Section HC are compared with those from Sections B and D, again some interesting differences emerge. The low percentage of triangles in UP is even more contrasted in comparison with the insignificant fluctuation of the other layers. Neither Section B, nor Section D reaches such high percentages of lanceolates as Section HC. The previously mentioned distinction in the occurrence of trapezes, on the other hand, is less obvious, since both Sections B and D have higher values as WL.

As for the various sub-types, triangles are treated separately below.

Table LVII. Ageröd I. Distribution of narrow microliths.

Type	WL				UP				B				D			
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
Triangles			43	81.1			49	67.1			332	79.2			23	92.0
Lanceolates																
type 6 a	3	5.7			5	6.8			22	5.3						
type 6 b	3	5.7			3	4.1			5	1.2						
type 6 c					3	4.1			3	0.7						
			6	11.4			11	15.1			30	7.2				
Narrow trapezes																
type 7 a	1	1.9			9	12.3			39	9.3						
type 7 b	1	1.9			3	4.1			11	2.6					2	8.0
			2	3.8			12	16.4			50	11.9				
Segments			2	3.8			1	1.4			7	1.7				
Total number																
of intact			53				73				419				25	
examples																

There are 43 triangle microliths in WL and 49 in UP. They are divided into sub-types. In tables LVIII and LX the sub-types of triangle microliths based on retouch and proportion respectively were linked together with those from Sections B and D. Table LVIII encompasses all 6 retouch combinations that are represented among the triangle microliths from Section HC. The two combinations that are not represented in every settlement constitute a very small group.

When making a comparison, attention must be paid to the variation in number of intact microliths. In the case of WL and UP, the difference in number is minor, hence correlation potentials are good. Section D is more problematic, and the number of narrow microliths of Section B shows still more deviation from that of the others. This circumstance makes a detailed examination of relations within Section HC more difficult. Only aIV shows an even, in this case decreasing, alteration of percentage. The alteration of aI may be divided into the percentages of WL and UP on the one hand, and the more than twice as high values in Sections B and D on the other. aII shows a perceptibly decreasing tendency save for Section D, while the aIII type except of UP has a relatively constant value. In conclusion, it may be said that the percentage of triangle microliths with a partially retouched side C is higher in WL and UP than in Sections B and D.

In order to compare the total of triangle types occurring in the settlements, the correlation coefficient was calculated and represented in tables LIX and LXI. Taking into consideration the extensive variation in total number, the conclusions that can be drawn from the correlations are not very definite. To be noted nonetheless are the low values of the correlation coefficient in table LIX of UP as compared with that of Sections B and D, and the somewhat higher values of WL. The correlation between WL and UP may also be regarded as relatively low. However, these results should be related to those obtained when comparing to the grouping constructed of proportion elements in table LX. Looking at the correlation coefficient figures in table LXI, the highest value of correlation is found between UP and B, while the correlation value between B and D is relatively low.

As mentioned previously, the percentage of isosceles triangles was taken as gradient for the Early Mesolithic chronology (Chapter 8.3). The percentage of this type is quite high in WL, which is an indication of the chronological position of this layer in relation to Sections B and D. The total percentage of type 4 and 5 triangle microliths results in a minor difference between WL and UP - 47% to 49% - but deviates markedly from the total number in Section D,

When following Welinder's division of triangle microliths, the contrast between Section HC and Sections B plus D is considerably more accentuated. Since his definition is based partly on a primary proportion element, namely the maximal width, the significance of this limitation should be taken into consideration in the comparative study. Reckoning the relation of the group having 1-14% of 1₁ to the Sværdborg type, the following percentages will be obtained: WL 57%, UP 53%, B 80% and D 83%, thus giving one more contrast between Section HC and Sections B plus D.

Table LVIII. Ageröd I. Distribution in position of retouch of triangle microliths.

Position of retouch	WL		UP		B		D	
	No.	%	No.	%	No.	%	No.	%
aI	10	23.3	9	18.3	154	46.4	11	47.8
aII	18	41.9	12	24.4	67	20.2	9	39.1
aIII	4	9.3	17	34.7	36	10.8	2	8.7
aIV	9	20.9	10	20.4	36	10.8	1	4.3
bII	1	2.3			2	0.6		
dII	1	2.3	1	2.0	2	0.6		
Left					35	10.5		
Σ	43		49		332		23	

Table LIX. Correlation coefficient according to table LVIII.

	WL	UP	B
UP	0.52		
B	0.57	0.39	
D	0.77	0.21	0.89

Table LX. Ageröd I. Distribution in morphology of triangle microliths.

	WL		UP		B		D	
	No.	%	No.	%	No.	%	No.	%
1	9	20.9	4	8.2	1	0.3	1	4.3
2	3	7.0			16	4.8	1	4.3
3	11	25.6	21	42.9	137	41.3	4	17.4
4	11	25.6	16	32.7	121	36.4	10	43.5
5	9	20.9	8	16.3	57	17.2	7	30.4
44-35	1	2.3			2	0.6		
34-20	6	14.0	10	22.2	79	23.8	3	13.0
19-15	13	30.2	20	44.4	84	25.3	1	4.3
14-1	14	32.6	15	33.3	166	50.0	18	78.3
Of these, Sværdborg type	8	18.6	8	17.7	132	39.8	15	65.2

Table LXI. Correlation coefficient according to table LX (1-5).

	WL	UP	B
UP	0.82		
B	0.68	0.96	
D	0.60	0.58	0.67

In UP, a total of 8 examples of broad microliths were found. They occur both in the lower, black culture layer and in the overlying peat. Three trapezes are of type 4, and four of type 5.¹⁵ One example is classified, according to definition, as a transverse arrowhead.¹⁶

All trapezes of type 4 display an angle measuring more than 45° for V¹, while all examples of type 5 have an angle measuring less than 45°. Taken as an entity, these trapezes differ from those in Section B in that type 5 constitutes the majority and the angle V¹ of type 5 is more acute. Just as in the case of the material of Section B, the problem concerning broad trapezes consists of two parts. The first question is whether the broad trapezes are contemporaneous with, e.g., the narrow microliths. The second question is whether types 4 and 5 existed synchronously. This complex of problems will be treated in detail in chapter 22.

Among the remaining flint artefacts, there is no example of any artefact type represented in Section HC but not in Sections B and D, or vice versa. Althin, in reporting the various artefact categories occurring in each layer, believes to be able to observe certain alterations.¹⁷ In his report, the microlith assemblage is the most meticulously described. Since the author's definitions of microlith types are different from those used by Althin, no direct comparison can be advanced. As for other artefact types, Althin mentions differences between various types of scrapers.¹⁸ But the difference between blade and flake scrapers is not really significant. The relation between the two types of scraper is 1:1.1 in WL, 1:0.8 in UP, 1:1.0 in Section B and 1:0.9 in Section D.

In order to get an understanding of alterations of certain artefact types seen in a longer chronological perspective, Welinder also included the layers of Ageröd I in his study of the Early Mesolithic.¹⁹ In reviewing core axes, it emerges that a typological classification cannot be used as a chronologically anchored factor. There appears to be, on the other hand, a difference between the mean length of core axes, the Late Mesolithic axes being longer than those from the Early Mesolithic.²⁰ This difference is 6.9 cm in WL, 8.1 cm in UP and 9.6 cm in Section B. In this case, sources of error such as the amount of flints may probably be disregarded, since the situation is so very similar in all layers within Ageröd I.

The stone axes found in Section B, representing several types, have certain parallels in Section HC - stone axes occurring in all layers. Round pecked axes constitute the largest number. Their distribution in the layers varies. When the number of round pecked axes is compared with that of flint axes, the relation will be BL: 2:1, LP: 1:1, WL: 0 and UP: 0.25:1. Although with some reservation, these figures nevertheless might illustrate the diminishing importance of stone axes as time went by and flint axes were preferred more and more. As for other types of stone axes, there is one type in BL and LP which Althin calls stone clubs with shaft-hole. Only one of these, a fragmentary example, has a completely finished shaft-hole. The remaining two items were deemed to be rough-outs.²¹ One of these has two opposite cavities, the other has only one. In treating similar artefacts from Danish settlements, Henriksen interpreted them not as rough-outs but functional artefacts.²² According to her, they were used as weights in drilling, and the hollow was meant to fix the borer. This interpretation seems convincing.

Two axes, a fragment from BL and an intact example from WL, do not belong to the round pecked axes. The fragment constitutes the cutting edge of a 6.0 cm wide axe measuring only 1.1 cm in thickness.²³ The raw material is slate, and both sides and edges are carefully ground. The example from WL may be likened to stone axes nos. 4-6 in Section B (Chapter 8.10.4). It is 8.7 cm long and 4.4 cm wide. Its entire surface had been ground, but there are still traces of both the striking and the pecking technique.

Most scholars regard the change occurring in the nature of micro-blade cores, when handle-cores, type CI, replace conical micro-blade cores, type CII, as a chronologically conditioned factor.²⁴ For this reason it is important to reckon the relation of the two types of micro-blade core as they occur in the four find units. The relative percentage of type CII is: WL: 17%, UP: 9%, Section B: 5% and Section D: 0%. Thus, a clearly decreasing frequency of type CII emerges. The relative percentage of handle-cores with working faces on both ends is 0% and 9% respectively for WL and UP, but 25% and 15% respectively for Sections B and D. The frequency of micro-blade cores of type CIII also exhibits a tendency to decrease: WL: 4%, UP: 5%, B: 2% and D: 0%.

From both WL and UP a great number of antler and bone artefacts are extant.²⁵ It was not possible to demonstrate definitely deviations of chronological nature between the two layers. When correlating Section HC, Sections B and D, the varying degree of preservation has to be noted. Compared to the number of flints, the number of antler and bone artefacts in Section B is minor. The relation flints/classified bones is in WL: 35:1, in UP: 35:1, in Section B: 400:1 and in Section D: 43:1. For this reason a comparison between Sections HC and B will bring very unsatisfactory results.

But there is one similarity which can be demonstrated, namely that slotted bone points seem to have

been an important artefact type in both sections.²⁶ The insignificant number of examples of all kinds including antler and bone artefacts in Section D makes a comparison with Section HC difficult. It has to be noted, though, that in Section D one find of slotted bone point and one of barbed point is documented while in Section HC the latter type occurs in minor numbers only.²⁷

As evidenced by a comparison of the various archaeological materials, it is impossible to arrive at a clear-cut chronological division of the Ageröd I complex. Distribution of artefact types such as narrow microliths and micro-blade cores indicate a bipartition into WL and UP on the one hand, and Sections B and D on the other. Other artefacts such as blade and flake scrapers or stone axes appear to demonstrate a close tie existing between find-producing layers. As for other kinds of implements such as blade knives, burins and rectangular artefacts, differences in frequency between the layers do occur, but whether they are chronologically significant is difficult to decide. Their chronological value was usually considered insignificant and a thorough study of e.g. the Danish context is often hampered by considerable sources of error, since quite often an arbitrary selection of finds to be preserved was made in the field itself. A comparison of several artefact types must consequently be reduced to a statement about presence or absence of a certain given type.

Sixteen samples were taken from the various layers of Ageröd I:HC for radiometric dating supplementary to the pollen-analyses. Whenever it was possible, two or three different specimens of organic matter were collected. The number of samples is unevenly distributed over the four layers, depending entirely on whether access to suitable material could be found or not. The result is the following: BL: 2, LP: 4, WL: 7 and UP: 3. Gathering samples was most difficult in layers BL and UP, in the former because of low find frequency. In the case of the latter, the main problem was the extensive oxidation which had taken place, whereby practically all organic traces of human activity had dried out. In one of the layers, BL, only charcoal was used as samples. In the others, even bone and hazelnut shells were dated. The resulting determinations are distributed as described in table LXII and illustrated in fig. 85.²⁸

Table LXII. Ageröd I:HC. C 14 readings.

Layer	Sample	B. P.	b. c.	Material	Treatment
BL	Lu-1005	8320 $\pm$ 85	6370	Charcoal of Pinus	Preparation with HCL and NaOH
BL	Lu-875	7970 $\pm$ 80	6020	Charcoal	Mild preparation
LP	Lu-992	8320 $\pm$ 85	6280	Charcoal of Pinus	Normal preparation
LP	Lu-994	8000 $\pm$ 80	6050	Charcoal of Pinus	Normal preparation
LP	Lu-871	7880 $\pm$ 85	5930	Bone of Cervus Elaphus	Collagen extracted by Longin's method
LP	Lu-752	7740 $\pm$ 80	5790	Hazelnut shell	Mild preparation
WL	Lu-753	7910 $\pm$ 80	5960	Hazelnut shell	Normal preparation
WL	Lu-993	7870 $\pm$ 80	5920	Charcoal of Pinus	Normal preparation
WL	Lu-754	7860 $\pm$ 80	5910	Charcoal of Corylus	Mild preparation
WL	U-4081	7750 $\pm$ 80	5800	Bone of Cervus Elaphus	Collagen received after EDTA treatment
WL	Lu-755	7710 $\pm$ 80	5760	Bone of Cervus Elaphus	Preparation of collagen with 0.5% NaOH
WL	U-4082	7415 $\pm$ 115	5465	Bone of Cervus Elaphus	Collagen received after EDTA treatment
WL	Lu-872	7220 $\pm$ 70	5270	Bone of Cervus Elaphus	Collagen extracted by Longin's method
UP	Lu-1006	7810 $\pm$ 80	5860	Charcoal of Pinus	Normal preparation
UP	Lu-874	7770 $\pm$ 80	5820	Charcoal	Normal preparation
UP	Lu-915	7470 $\pm$ 80	5520	Bone of Cervus Elaphus preserved with glycerol	Glycerol extracted. Collagen extracted by Longin's method

Layer BL does not satisfy the requirement of a minimum of three samples per context as stated by Neustupny.²⁹ Reckoning the mean values, the result will be BL: 6195 b.c., LP: 6013 b.c., WL: 5726 b.c. and UP: 5730 b.c. These dates have to be related to the variation range of central values in the layers, which will be BL: 350 years, LP: 440 years, WL: 690 years and UP: 340 years. Only WL deviates considerably from the variation range of the other layers, because two C 14 samples - Lu-872

and U-4082 - gave a considerably lower value than the rest. The sample in question was extracted collagen. These two datings as well as U-4081 were made with samples deriving from the same bone, but two different methods of extraction were used. The considerable difference in central values - 530 years - indicates the difficulty inherent in evaluating datings of bone. Bone coming from Section HC is porous for the most part, so that the possibility of humus having penetrated it cannot be excluded. Five of the six bone samples delivered the youngest dates in the respective layers.

Note has also to be taken of the distribution of the obtained values within each layer. For example, the values from LP are relatively evenly distributed, while WL and UP display an uneven distribution and a tendency to group formation. This is particularly true of WL.

The differences in distribution notwithstanding, it is possible to discern a chronological differentiation, BL forming the oldest layer and UP the youngest - entirely in agreement with stratigraphic observations. According to the definite datings of pollen zones, the three lowermost layers and very likely even UP should be older than 6000 b.c. Compared to the dates accounted for when stating the zone boundary, deviations within Section HC from the boundary line appear to be not too pronounced.³⁰ However, the correlation may be influenced by the circumstance that the samples were located at different distances from the ground surface and thus exposed in varying degrees to organic elements penetrating from above.³¹

Among samples with mild preparation, i. e., Lu-875, Lu-752 and Lu-754, the two first ones represent the youngest dates in the respective layers, and the third is the youngest of all vegetational samples. Bones from the investigation of UP in 1972-74 were judged not suitable for C 14 assays because of their bad condition.

Sample Lu-915 is a cannonbone of *Cervus Elaphus*, excavated in 1947. The bone in question had been preserved in glycerol which was extracted prior to the C 14 reading.³² But according to S. Håkansson, the possibility of some minor amount of glycerol having remained in the collagen cannot be excluded. This may explain the relatively low value the sample gave.

In evaluating the radiometric datings of the layers of Section HC in relation to Sections B and D, the resulting values will deviate from the pollen-analyses. If the mean values are to serve as chronological indications, the succession will be as follows: BL - B - LP - D - WL - UP. In other words, Sections B and D would be older than WL which is the most easily distinguishable layer within the stratigraphy of Section HC, and also the Quaternary biologically best dated. Although there is some doubt about the pollen-analytical dating of Ageröd I, the above given chronological position seems to deviate too strikingly. Temporal differences of several centuries, as in the present case, must be considered in the light of understanding the margin of error inherent in C 14 datings. The standard deviation of 1 sigma indicates only a liability of 68% for the real age being within the given limits. However, the C 14 datings show that there is no major difference in age between the find-producing layers within the Ageröd I complex. In consideration of the fact that the preparation of the samples was often different and the samples themselves were of diverse nature, there is no direct documentation proving that the sequence from WL to D would not have been deposited during a relatively short period, i. e., perhaps within a couple of centuries, as seen in relation to the entire time perspective.

Taking as a basis the standard pollen diagram from the central part of the bog Ageröds Mosse in combination with pollen-analyzed artefact-producing strata of Ageröd I, Nilsson, as mentioned previously, has established a hypothetical curve of changes in water level that had taken place in the Ageröd-Rönneholm basin.³³ A remarkable rise in the water level can be traced during the mid-part of the BO 2, which was probably contemporaneous with the oldest remains of settlement in Ageröd I. Nilsson aims to document a sinking of the water level during the later part of BO 2 which was of short duration but quite clearly defined. Chronologically, this would occur at the time when WL is deposited, Gytte layers which Nilsson regards as having transgression characteristics are dated to the early part of the AT 1. A new maximum is reached during the AT 1, to be replaced by a minimum of long duration during the AT 2.

Changes in water level were paid attention to later on in the course of investigating two South Swedish lakes, the Trummen in central Småland and the Immeln in north-western Scania.³⁴ Changes in these two lakes have taken an almost identical course. During the BO 2 sedimentation increases and some organic matter is added. This has been interpreted as the result of a rise in water level, continuing into the AT 2. The pollen diagrams do not show the same remarkably clear but short retreat as in the Ageröds Mosse. The difference between the results of Nilsson and Digerfeldt are due, according to Digerfeldt, to variations in depth of the investigated lakes. In a shallow lake such as the prehistoric Ageröds Mosse, even changes of less amplitude can be traced and read in the stratigraphic succession, while in deeper lakes only changes taking place over a long period of time can be observed.³⁵

In Ageröd I, measurements of the various levels of the settlement strata were taken, in order to profit from one more chronological differentiation method, if possible - since the settlements in Sections HC and Sections B plus D derive according to other dating methods from the change in water level of short duration in the BO 2. WL would then represent the minimum, while UP and Sections B and D would have been deposited during the following rise in water level. The altitudes were taken at points located on the

borderline of settlement and refuse area: WL: 54.07-54.31 m above sea-level, B 54.45-54.54 m above sea-level and D: 54.13-54.20 m above sea-level. A difference between WL and Section B will emerge clearly which, knowing about the change in water level, will indicate a time perspective.

In contrast to WL and Section B, the culture layer in Section D overlies thick organogen layers, parts of which are above the water table. Where this is the case, oxygen may have seeped in and started a new accelerating process of humification. This process was in all likelihood particularly active during the 1900s, when extensive areas of the northern part of the bog Ageröds Mosse were cleared by drainage. When checking up on measurements of transects from Section D, a decrease of more than 10 cm was noted which had occurred between 1948 and 1973. Therefore, the settlement layer in Section D should originally have had an altitude higher than that of WL. In the case of UP in Section HC, the measurements taken indicate that it originally had an altitude somewhat lower than that of Section B.

Assuming that settlement in Ageröd I has taken place during a rise in water level, the measurements would confirm the sequence WL-B-D.

The abundance of carbonized wood found in the Ageröd complex was a priceless asset as a basic material for C 14 determinations of the artefact-producing layers. Nor is the role of this material as a source of information thereby exhausted. The charcoal itself can give valuable contributions to the study of vegetation in the vicinity of the site.

The pollen-analyses accounted for earlier have certain inherent sources of error, which have to be taken into account when trying to reconstruct the floristic composition of a limited, minor area. Particularly important is the fact that the pollen may be transported over long distances, as well as the extremely varied pollen production of various kinds of trees. Among the pollen transported over long distances, those of pine and birch are most noticeable.³⁶ In a pollen diagram, these species would reflect the vegetational picture extending over a larger area around the point where samples are taken than would, e.g., the alder. The topographic position of the test point also seems an important factor in an evaluation of frequency of pollen transported over long distances.³⁷ Extensive basins, such as the Ageröds Mosse was, will collect a higher percentage of long-distance pollen than small bodies of water - pine and birch pollen are to a large extent dispersed above the level of the trees. There is, moreover, no safe method correlating this source of error. In the diagrams in question as much as 50% of the pollen could originate from a distance farther than 10-20 km away from the test point.³⁸ Pollen production of various trees and herbs differs widely, but with the aid of empiric research by gathering pollen, the correlation figures of trees could nevertheless be reckoned.³⁹

According to the coefficients published by Andersen, the distribution of wood species in sample 5 of the pollen diagram, fig. 88, in reality have the following values: alder 22.4%, pine 20.7%, hazel 15.6% linden 15.3%, birch 14.1%, elm 8.2% and oak 2.7%. The correlation is based on the pollen diagram illustrated in fig. 14.

In contrast to the pollen diagram, charcoal should reflect vegetation existing in the immediate vicinity of the settlement. Wood was presumably available to a fully sufficient degree within a relatively limited area. In addition, wood determination of the charcoal will also complement the vegetational picture. For instance, trees and bushes not represented by their pollen because of limited spreading capacity or low tolerance to destruction of the pollen can be documented with the help of charcoal.

Practical experiments show that long-distance transportation of charcoal by water, a conceivable source of error not to be neglected, may be almost excluded, for the charcoal will after a short while, at the most after an hour, become waterlogged and sink.⁴⁰ But charcoal distribution is afflicted with another significant source of error, namely the principle of selection by prehistoric man - a principle which of course itself contains important information. It would be altogether unrealistic to imagine a random choice of firewood. Factors such as height and size of the tree to be used, but first of all the energy output of the kind of wood must surely have been decisive.

A determination of charcoal pieces from layer 2 of Section B gave the following distribution: pine 80%, alder 6.4%, hazel 4.8%, elm 4.3%, birch 2.4%, oak 0.8%, willow 0.8% and bog-myrtle 0.8%.⁴¹ To judge by the annual growth-rings, these pieces derive from branches or minor trunks. Several pieces display a kind of structure indicating that they were burnt when they were halfway rotten.

Of all the woods represented in the pollen diagram only the linden is missing from the determination, whereas the bog-myrtle is an addition to the list of woods known so far in the area. Pine is markedly predominant, completely lacking any parallel in the correlated wood frequency. There might have been a dense stand of pines in the vicinity of the settlement, forming a higher percentage here than in the rest of the forest - but more likely this particular kind of wood was consciously selected for its high output of energy. That this was so is indicated by the fact that the previously mentioned carbonized sticks from the refuse area in Section were all of pine (Chapter 8.17).

In consideration of the above reasoning about principles of selection, charcoal analysis would first of all constitute a complement to pollen-analysis. By correlating charcoal and pollen-analyses from places differentiated temporally as well as spatially, it should moreover be possible to examine to what extent

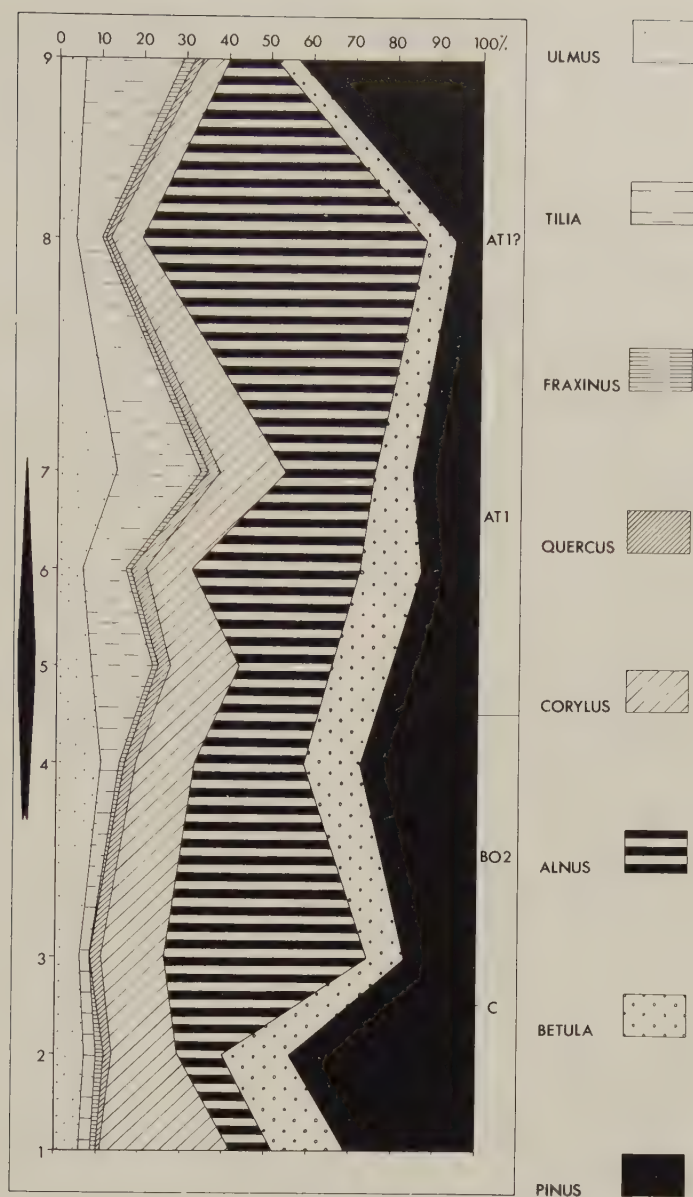


Fig. 88. Ageröd I:B. Correlation of pollen diagram fig. 14.

charcoal can be used for establishing conclusions about chronology. The result would be of great significance when dating charcoal-producing settlement finds where there is no chance of making any pollen-analysis.

To this end, wood-anatomical analysis was made with charcoal from artefact-producing layers, both such which temporally and spatially are close to and such which differ from Section B. Each and every layer within Section HC as well as the Atlantic coastal settlements Segebro and Arlöv were subject to investigation.⁴² The percentage distributions of these settlement layers - 7 in all - are registered in the seriation diagram fig. 89. The number of analyzed pieces varies from 41 (BL) to 125 (Section B).

The four layers of Section HC show a continuous decrease in pine, while the mixed oak forest elements increase. Mainly in order to find out which kind of wood could have importance for establishing a time perspective, Segebro and Arlöv were also included. Their distribution deviates considerably; they show a low percentage of pine, high values of hazel, oak and elm and an occurrence of linden. Pine seems to be a usable indicator for a chronological seriation as well as oak, elm and linden. Hazel, tied to more specialized biotopes, in this case beach vegetation, has to be regarded as a very unreliable variable. The perceptible variations, which probably reflect changes in the composition of the forest, may have been accentuated by modifications occurring in the principles of selecting firewood, in that e.g. the pine was replaced by other kinds of wood belonging to the steadily increasing mixed oak forest.

Analyses were also carried out on charcoal-producing settlements within Ageröds Mosse that are dated

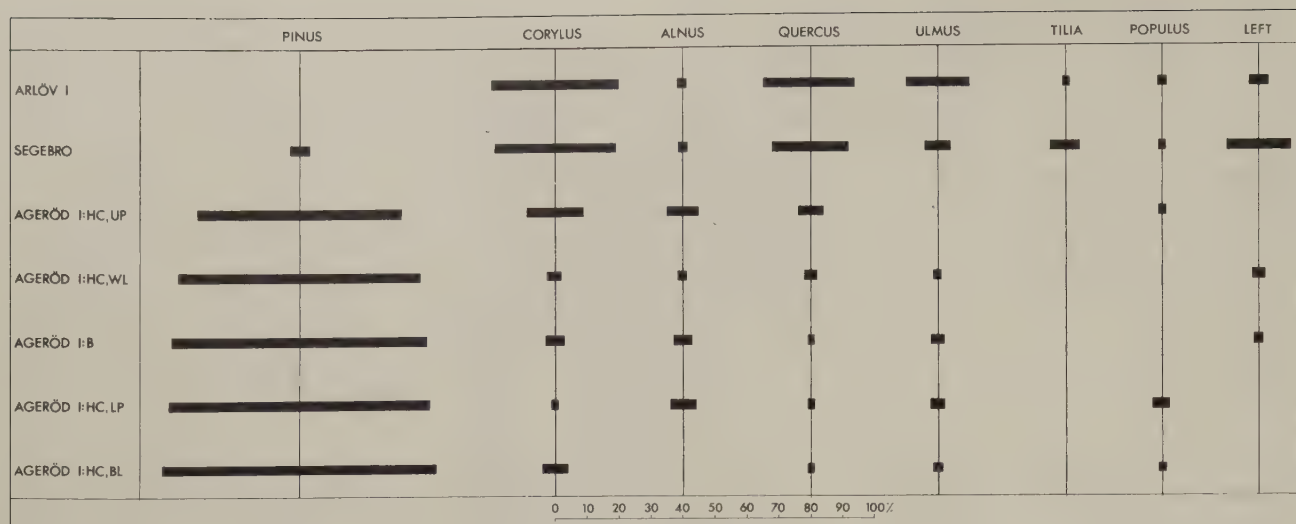


Fig. 89. Seriation diagram of distribution of charcoal at seven Mesolithic settlements.

to the Atlantic period. This was done in order to correlate possible deviations between central Scania and the south-western part of Scania where Segebro and Arlöv are located. The find localities which were subject to wood-anatomical determination, namely Ageröd V and Ageröd VI, gave a spectrum containing high values of alder and blackthorn.⁴³ Both are typical representatives of the overgrowth zone, located a couple of 100 m from solid ground, in which the settlements were.⁴⁴ As a consequence, the values of pine and mixed oak forest are completely different from those registered in fig. 89.

Based on the above premises, the frequency distribution of Ageröd I:B should be placed between that of LP and WL. The general conclusion drawn from this is that Section B appears to be chronologically more or less synchronous with Section HC.

11. Zealand

When comparing Danish and Swedish pollen diagrams, a considerable dilemma arises from the fact that the two countries apply different zoning systems, which to boot are called by the same name. This is first of all true of the definition of the Danish borderline between zones VI and VII, both of which are called Atlantic. In the system proposed by Jessen the borderline VI/VII is set at the point where the increasing mixed oak forest curve and the decreasing pine curve intersect.⁴⁵ Nilsson points out the unreliability of this definition.⁴⁶ Pine pollen frequency is partly dependent on the variety of peat, a factor which can lead to an incorrect positioning of the zone boundary in the diagram, and this in turn can be misleading in a comparison. Nilsson sets the borderline VI/VII in Denmark as being contemporaneous with the Scanian transition BO2/AT1.⁴⁷ The difficulties increase when Jørgensen, having the ambition to bridge the source of error pointed out by Nilsson, defines the borderline as the point at which the curve of the steadily increasing mixed oak forest comes to an end.⁴⁸ And since Jørgensen also operates with a new definition of the beginning of period VI, it is more complicated to place this period in either Nilsson's or Jessen's zone system. Both Nilsson's and Jessen's as well as Jørgensen's zone systems have been used for dating Danish bog settlements. Seen from the point of view of correlating them with Scanian settlements, the most interesting investigation was carried out by Nilsson, when he re-examined the dating of the Holmegaard settlement.⁴⁹ Nilsson opined that Holmegaard can be placed in the sub-zone BO 2 c, which is so very important for dating the Ageröd settlements. No settlement continuing into the AT 1, on the other hand, could be documented according to him.⁵⁰ In a general survey of settlements of the Maglemose Culture, he dated the youngest ones as being contemporaneous with Holmegaard. Jørgensen thinks that the youngest settlement, Verup I, reaches into zone VII or, according to the Scanian system, into the beginning of the AT 1.⁵¹ As things stand at the moment, it is practically impossible to verify any of the above dates. Both Nilsson and Jørgensen admit that certain differences in the flora are discernible, but it is impossible to unravel to what extent they are chronologically significant.

A number of C 14 datings of pollen zone boundaries are available from the bog Draveds Mosse on Jutland. The transition V/VI, i.e., the borderline between the Early and the Late Boreal period, was dated to ca 6200 b.c., a date which means a shift of more than 300 years as compared to the results of Scanian investigations.⁵² The date of the boundary IV/V is also considerably younger at Draveds Mosse. The

latter date is based on only one radiometric determination, while the former is based on two. Thus, this unsatisfactory basis attains undue importance in setting the borderline. The situation thus created led Welinder to exclude all chances of a correlation of the cultural development in Jutland on the one hand and Scania on the other based solely on results of Quaternary biological investigations.⁵³

The date for Jessen's zone border VI/VII is based on 5 radiometric samples which gave values between 5890 ± 140 b.c. and 5640 ± 150 b.c. with a mean value of 5770 b.c.⁵⁴ This would deviate about two centuries from the Scanian zone border BO 2/AT 1, which in Nilsson's opinion is by and large contemporaneous with Jessen's VI/VII. Datings published later on gave the values 5970 ± 150 b.c. and 5940 ± 150 b.c.⁵⁵ A sample from an elk bone at Taaderup – pollen dated to the zone border VI/VII – delivered the value 5860 ± 120 b.c.⁵⁶ These datings indicate that the difference between Jessen's and Nilsson's zone system is insignificant, and the border VI/VII may therefore be said to be equal to the border BO 2/AT 1.

The settlement Ulkestrup, dated by Jørgensen to the older part of zone VI, is important, for it belongs to Becker's period 3 and thus constitutes a terminus post quem of the Late Maglemose Culture.⁵⁷ Three C 14 assays from Ulkestrup gave values between 6220 ± 120 b.c. and 6080 ± 140 b.c.⁵⁸ These values are in no way different from what can be expected after having studied the sequence in Agerød I:HC. The chronology of the latest part of the Maglemose Culture will have to be based on a survey and assessment of archaeological facts.

The main importance of the Danish material lies in its potential as a framework of an extended perspective into which the South Swedish find complex may be fitted. As mentioned previously, intensified peat-cutting in the 1940s brought about the discovery of numerous new find localities (Chapter 1.1). Their archaeological investigation was mostly carried out under great pressure for time, and the same factor also put continued treatment and publishing of the material at a serious disadvantage. Extensive settlement finds lay about unattended, and only schematic presentations were published. Brinch Petersen wittily described the research situation by declaring: "we do not know what we really know".⁵⁹ It was only during the 1970s that the most important finds with respect to research on the later part of the Maglemose Culture were published.⁶⁰

Bille Henriksen dealt thoroughly and in detail with finds originating from investigations carried out in 1943–44 in the bog Sværdborg Mose on Zealand. The investigated area lies some 10 m north of excavations carried out by Friis Johansen and Broholm.⁶¹ It is divided into three fields, A–C, measuring from 288 m^2 to 124 m^2 . Find density, calculated in mean value per square metre, displays marked variation between the individual fields.⁶² The microliths of Field C, which had the largest amount of finds, will be used below in a correlation with Scanian settlements.

Bille Henriksen set up a period system for the Late Maglemose Culture, based on the Sværdborg finds and divided into two periods.⁶³ Similarly to Welinder's chronology, the border between the Early and the Late Maglemose Culture is represented by the introduction of conical micro-blade cores.⁶⁴ The two periods of the Late Maglemose Culture are called yM 1 and yM 2. The division is based on certain types of triangle microliths and the percentage distribution of various types of scrapers.⁶⁵ Three main types are distinguished among the triangle microliths and two of these, namely types B and C, are chronologically significant. Type B, which is type specimen of yM 1, measures more than 0.6 cm in width. The younger type C measures less than 0.5 cm in width. A second element of distinction is the angle formed by the two short sides of the triangle. The angle of type B measures between 110° and 130° , while that of type C is more obtuse, measuring 140° – 150° . However, it should be noted that there is no clear-cut division between the two types according to the published figures, since all microliths are recorded with a difference of ten degrees.⁶⁶ In the case of the Sværdborg material, type C shows a tendency towards being an isosceles triangle. Another element of distinction, namely thickness, is also used. Type B is thicker than 0.15 cm, while type C measures less.⁶⁷

In yM 1 both round flake scrapers and short blade scrapers occur. yM 2, on the other hand, contains long blades with retouch on their end. The lack of unambiguous definitions distinguishing between short and long blades with end retouch must be said to be a serious flaw in Bille Henriksen's typology, since it makes comparative study much more difficult.

Certain other artefact types such as conical micro-blade cores and handle-cores show different frequency percentages in the two periods.⁶⁸ Bille Henriksen's chronology allows Becker's third and youngest period of the Early Maglemose Culture to remain, although it is ranged within the younger Maglemose Culture, yM 1. His fourth and fifth period are joined into one phase, yM 2.⁶⁹ The goal of her division into an older and a younger period of the Maglemose Culture was to link together those settlement contexts which were dated within Jørgensen's pollen zone VI and which contain triangle microliths of so-called Sværdborg type.⁷⁰ A study correlating it with artefact types from the Kongemose Culture resulted in the hypothesis that yM 2 can chronologically be equated with that culture.⁷¹ A detailed examination of this view will be given in chapter 22.

There are three datings for yM 1 from the bog settlement Ulkestrup II, giving a central value of 6133 b.c.⁷² The two C 14 assays made with bone samples from Sværdborg I, giving

4450 $\pm$ 120 b.c. and 4170 $\pm$ 180 b.c. are rejected on the grounds of probable admixture of secondary humus.⁷³ No other published radiometric datings from Danish settlements of the yM 2 exists.

As for the Svaerdborg finds, their Quaternary biological investigation and the purely archaeological correlation study are left. Sørensen has analyzed samples originating from a transect connected to one of the fields.⁷⁴ Unfortunately, there is no clearly-marked artefact-producing layer at the test-point and thus the geological chronology of the settlement is somewhat uncertain. In addition, one or possibly two sedimentation gaps are suspected in connection with the level which is thought to be synchronous with the settlement. Svaerdborg I is with some reservation dated to an early part of Jørgensen's zone VI.⁷⁵ In order to obtain a more secure dating, pollen-analyses of a total of 37 peat samples taken from bones found in the culture layer were carried out, thus trying to find out the relationship between mixed oak forest pollen and pine pollen called QM:P index. In one case only was the index higher than 1, which means a date later than Jessen's zone border VI/VII. As mentioned previously, this border is probably synchronous with BO 2/AT 1. Sørensen considers the bone material, and the culture layer as well to be dated to ca 6000 b.c.⁷⁶ The publication is quite peculiar in that it contains two incompatible dates for the same settlement - Bille Henriksen's 5600-5330 b.c. and Sørensen's ca 6000 b.c. Even more amazing and strange is the fact that no comment whatsoever on the results of the Quaternary biological investigation is made in the archaeological treatment.

Similarly to the comparison of the Ageröd I complex, detailed study begins with the survey of narrow microliths. The triangle type entirely dominates the assemblage. The results of the division of triangle microliths is illustrated in a diagram, together with the Ageröd settlements WL, B and D (Fig. 90 and Fig. 91). These diagrams should enable the researcher to study the triangle forms of the Danish settlements as related to the Scanian ones in order to arrive, if possible, at important conclusions about cultural development. To this end, even an older material, namely Svaerdborg II, the eponymous settlement of Becker's third phase - but according to Bille Henriksen, yM1 - is included.

When evaluating conclusions drawn from these diagrams, the considerable difference in number between the 23 examples from Ageröd I:D and the 781 examples from Svaerdborg I:C has to be appreciated. Even so, some interesting observations can be made. The difference between Svaerdborg II and Svaerdborg I:C, fig. 90, is striking. The former completely lacks isosceles types, while the latter's percentage of Svaerdborg triangles is relatively low. Unfortunately the author has had no occasion to measure triangle microliths from a settlement belonging to Becker's period IV. According to the scheme, triangles of Svaerdborg type ought to dominate this period too.

It should be noted that isosceles triangles from Svaerdborg I:C deviate in length and width proportions from their older parallels. The mean width of this type amounts in Svaerdborg I:C to 0.5 cm, and this at the same time also constitutes the mean width of all triangles of the settlement. In other words, only the make-up of retouch differentiates an isosceles triangle from a triangle of Svaerdborg type and not, as was the case in an earlier phase, an isosceles, broad and short type from a long and narrow scalene triangle.

Comparing these results from the Danish settlements with Scanian sites, the resulting picture will show several differentiating features. Though WL appears to have a counterpart to the high percentage of isosceles triangles in Svaerdborg I:C, there is nonetheless a distinction. While the Danish settlement has high values for a particular form, which in several cases borders on the isosceles values, i.e., type 2, type 1 from WL stands remarkably isolated. The percentage of Svaerdborg microliths is also different in the two contexts. A majority of the triangles having an l_1/l_2 relation of 1-14% in Svaerdborg I:C correspond to the definition of the Svaerdborg type - a proof of the relatively narrow microlith types of this settlement (Fig. 90).

With respect to the position of retouch, triangles from Svaerdborg II are distinct from those of Svaerdborg I:C as well as the Ageröd settlements (Fig. 91). At Svaerdborg II, a major number of triangle microliths are provided with retouch on side C, a feature which only occurs sporadically at the other settlements. If shape is the only feature taken into consideration, Svaerdborg II and the Ageröd settlements are in better agreement than the latter and Svaerdborg I:C. The question then arises how the Scanian settlements should be integrated into the Danish chronology of the Late Maglemose Culture. Were seriation the decisive factor, Svaerdborg I:C and the Ageröd settlements should be contemporaneous in regard to retouch distribution. In contrast, judging by shape alone, the Ageröd settlements would seem to be approximately contemporaneous with Svaerdborg II. If Brinch Petersen's contention that Ageröd I:B and Ageröd I:D are the youngest settlements of the Maglemose Culture, were correct, the composition should be entirely different according to the seriation.⁷⁷ Both settlements should display a large proportion of isosceles triangles with only a few scalene examples. Even assuming that Ageröd I:B and Ageröd I:C contain material from all of the Late Maglemose Culture, the composition of the assemblage would still deviate from what could be expected according to the Danish material. It follows that the results will be both contradictory and confusing.

The distribution of the rest of the narrow microlith types hardly contributes to an acceptable solution. The number of microliths other than triangle microliths in Svaerdborg I and II is trifling. In the former

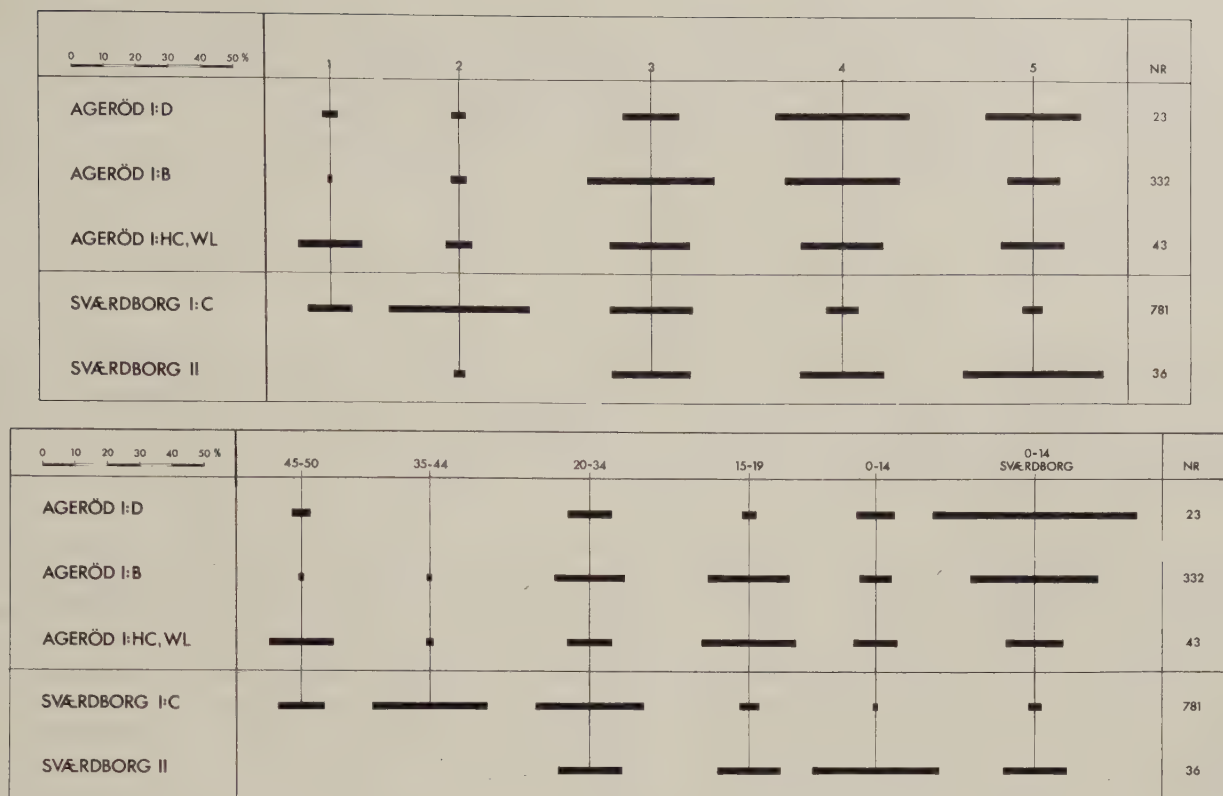


Fig. 90. Distribution of triangle microliths according to Brinch Petersen's et al. typology (above) and Welinder's typology (below).

settlement they occur as narrow trapezes, but their percentage amounts to no more than 0.5%. In Sværdborg II the author has identified one intact example of lanceolate, i. e., 2.7% of the total number of microliths. The best correlation in regard to this observation exists between the Danish settlements and Ageröd I:D, where the non-triangular microliths consist of two narrow microliths, constituting 8% of all narrow microliths.

The alternatives thus crystallizing out are twofold: we can either try to place the Ageröd settlements somehow within the Danish chronological system - but this meets considerable difficulties in the distribution of triangle microliths. Or, the other alternative is to regard the cultural development in Zealand and in Scania as two parallel phenomena, having a certain measure of similarity and some differences that need not be chronologically binding. For a continued discussion, a considerably more solid ground is necessary than one which is based solely upon the study of narrow microliths. The most important thing then is to get more information about differences and correlations of other artefact types during the Late Maglemose Culture. To this end, first of all those artefact types should be dealt with which Bille Henriksen pointed out as having chronological relevance.⁷⁸ However, as noted previously, such treatment is made quite difficult by the vague definitions she uses. Her classification of micro-blade cores is the only clear and unambiguous detail. In this respect both Ageröd I:B and Ageröd I:D could conceivably be ranged in the same period as Sværdborg I:C.

Within all areas of Sværdborg I that were investigated 1943-44 both conical micro-blade cores and handle-cores occurred. The relative ratio of the former core type shows considerable variation from 40% in field B to 6% in field C.⁷⁹ In Holmegaard, equated with Sværdborg I, the ratio is 9%.⁸⁰ These figures can be compared with the variation within Ageröd I where the highest ratio, 17%, occurs in WL and the lowest, 0%, in Ageröd I:D. Bille Henriksen considers the high percentage of conical micro-blade cores in field B to be an important proof of this area containing artefacts from yM 1.⁸¹

As for differences existing between circular scrapers and short-end scrapers and truncated blades, the borderlines fluctuate. However, we get the impression that Ageröd I:B and Ageröd I:D had more similarities to settlements of the youngest phase of the yM 2 than to those of the older phase. In contrast, the type which is called retouched flake and blade lumps, and which is by and large the same as rectangular artefacts, belongs to an older phase of the Late Maglemose Culture. It is represented in the abovementioned layers of Ageröd I.

One important detail not to be forgotten is that tools from Sværdborg I:C have a different distribution

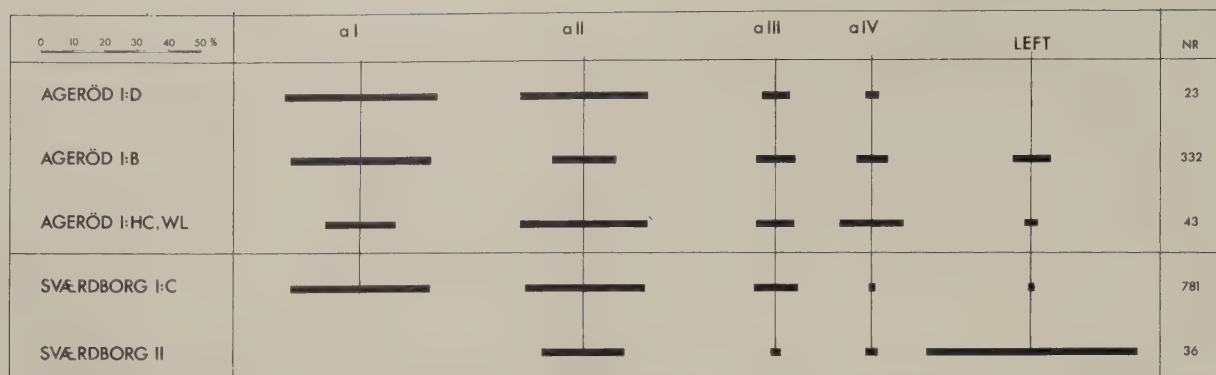


Fig. 91. Distribution of triangle microliths according to position of retouch.

than those from the Ageröd settlements. For example, the percentage of burins in Sværdborg I:C is only a good 2%, a figure which can be compared with 10% in Ageröd I:B. Similar differences are documentable for most of the artefact types, probably due to the fact that large amounts of waste products, after an initial sorting out in the field, were discarded.

One feature which the Danish and Scanian Late Maglemose Cultures both have in common is the occurrence of stone axes. Sværdborg I and Holmegaard I each has a round pecked stone axe.⁸² In the older settlements there are no such axes - an indication that stone axes have chronological, rather than chorological significance.

Among the finds from Holmegaard there is a stone axe with shaft-hole.⁸³ Its exact stratigraphic position is uncertain, but since no later admixed artefacts were ascertained, the object should be contemporaneous with the settlement layer. The axe, made of gneiss, is broken at the ca 2 cm wide shaft-hole. The 10 cm long fragment has a ground cutting edge with traces of heavy wear. The axe shows certain similarities to shaft-hole artefacts found at Ageröd I:B (Chapter 8.10.4).

There are numerous affinities but also certain differences between the antler and bone artefacts of the find contexts. They will be treated in detail elsewhere, but should nevertheless be mentioned briefly here, too, in order to complement the comparison.⁸⁴

Sockets with shaft-hole for axes are fairly common at Danish settlements. In contrast, the author found only two examples of the type with carved grooves, a form occurring at the Ageröd settlements.⁸⁵ Certain artefact types of antler or bone, known from Ageröd I, such as perforated pedicels of red deer antler, split wild boar tusks, bone chisels and bone plates interpreted as hand grips, do not occur during the Late Maglemose Culture in Denmark.⁸⁶

The distribution of bone point types is also markedly divergent. Barbed points, predominantly represented at Danish settlements, occur sparingly at the Scanian settlements. The distance between their barbs usually exceeds 1 cm.⁸⁷ The documented raw materials are antler, ribs and shaft bones. There are also a few barbed points with considerably more barbs, whose mean distance is 0.8 cm, thus bordering on the upper limit of leister prongs. The slotted bone point, so frequently occurring at the Ageröd settlements, is less common in Denmark. The difference emerges clearly when relating barbed points to slotted bone points, at Sværdborg 65 to 4, compared with 4 to 9 at Ageröd I:HC, UP. Also to be noted is the absence of leister prongs in Denmark, whereas in South Sweden they are documented up to the later phase of the Atlantic period.⁸⁸

No East Danish settlement having a distribution of broad microliths corresponding to that of Ageröd I:B or Ageröd I:D is known. In several find localities of the bog Aamosen, for instance at Kongsted, Maglø and Øgaarden, trapezes of type 4 are documented.⁸⁹ In addition, transverse arrowheads are also documented in all these localities, which, it may be feared, is indicative of the find-producing layers consisting of several settlements separated in time. Øgaarden, a settlement with numerous dislodged strata, has 15 examples of this type of trapeze which, however, have to be set in relation to the large number of oblique arrowheads, 116 items, also found there.⁹⁰ Surveying the find material, the author was able to identify 11 examples. One is of type 3, the rest of type 4. The mean length and width are 1.7 cm and 1.3 cm respectively. Thus, the trapezes from Øgaarden are a half-centimetre shorter than those from Ageröd I:B, while the difference in mean width is only 0.1 cm. The limit 1.0 cm in width is valid for these trapezes, but none of them is narrower. All examples have an angle V^1 measuring more than 45° .

The settlement at Verup, from the early phase of the Maglemose Culture, exhibits a number of stray finds, among them two trapezes of type 4.⁹¹ These finds are much too insignificant to draw any far-reaching conclusions from them, - still, they serve to illustrate the presence of this special type of broad microliths in East Danish settlements. The small number of find sites and the limited number of

type 4 trapezes indicate that the stage represented by Ageröd I:B and Ageröd I:D was of short duration in East Denmark. The few proofs there are come from large settlements with extensive find materials, located in areas that have been inhabited for a long period of time.

A few occasional examples of type 4 trapezes in find sites possessing a large number of oblique arrowheads can also be exponents of a form variation occurring at times during production – the number of trapezes at Øgaarden, however, excludes any such conclusion.

12. Jutland

The Gudenaa Culture in Jutland, published by Mathiassen in 1937, was later on revised by S.H. Andersen.⁹² He abandoned the proper name which labelled this culture and replaced it with concepts generally accepted for East Danish materials. Differences existing between finds from Jutland and those from East Denmark can, according to Andersen, be explained by regionally individualized characteristics. Within an area having quite essential variation in ecological settings, certain differences need not necessarily be chronologically conditioned.

The handle-core, which is of great significance in determining the Late Maglemose Culture, occurs very sporadically, so that classification has to be based to a still higher degree on the microlith assemblage. Andersen believes to have found features characteristic of the Late Maglemose Culture in a number of settlements in Jutland, mentioning in particular Springbjerg as a representative of this phase.⁹³ Brinch Petersen ranges this settlement in the fifth and youngest period of the Maglemose Culture.⁹⁴

The Springbjerg settlement, located in eastern Jutland, was investigated in 1942, on which occasion the artefact-producing plough-soil was sifted.⁹⁵ The finds include a large number, namely 507 pieces, of classifiable, narrow microliths.⁹⁶ That the assemblage contains a minimum of younger artefacts may readily be seen from the fact that only one transverse arrowhead is recorded. More than 17% of the total number of microliths are described as lanceolates. The next largest group, according to Berthelsen, consists of narrow trapezes, but it has to be noted that the majority of this group have one short side of the trapeze shaped by a break or have the bulb of percussion left and for this reason should not be counted. Thus, the percentage of narrow trapezes diminishes to 3%. Of the remaining examples, 54% were deemed to be triangle microliths, of which only 3% are isosceles. In regard to retouch no more than 11% are of type aI.

Two out of seven broad microliths are of type 4. The other five have concavely retouched sides.

The type assemblage deviates markedly from the late East Danish ones, but the present extent of our knowledge about the Maglemose Culture in Jutland does not permit us to determine whether Springbjerg should really be ranged in period V. Based directly on the East Danish chronology, the settlement would not be younger than period 3.

The question of dating also depends on how the occurrence of broad trapezes should be interpreted. Berthelsen points out that later elements might be admixed.⁹⁷ In other areas of Jutland Mathiassen has recorded several Mesolithic settlements, but of these, only a very small number boasts an assemblage which may be imagined as having come into existence within a reasonably short period of time. For the combination narrow microliths-transverse arrowheads is represented in nearly all find sites.⁹⁸ This circumstance is in most cases probably due to the fact that topographical alterations during the Late Boreal and the Atlantic periods have not taken place. For this reason, a terrain or locality was exploited for the same activity, for instance hunting or fishing, over a long period of time. This might also be an explanation of the documented regional individualities which are differentiated from the East Danish cultural development.

In spite of their mixed contents, Mathiassen's lists offer valuable information.⁹⁹ He records the isosceles with the retouch distribution aI among the triangle microliths, and with some hesitation this type may be interpreted as a period V form occurring on Zealand. His outline of frequency of trapeze types contains interesting information.¹⁰⁰ Of the total of 678 examples forming group D, i.e., broad trapezes and rhombs, type 4 is represented by no less than 163 items or 24%, thus constituting the largest part of the group. More than 80% of the type 4 examples have right-oriented retouch. Trapezes of type 5, divided by Mathiassen into two types, constitute 17%. This is proportionally less than another form, extremely rare in Scania, which resembles type 5 but with the difference that it has concave retouch on one or both sides. Type 2, represented by 77 items or 11%, comes fourth in size. No matter what conclusions may be drawn from this type distribution, the marked difference in the number of type 4 trapezes between West and East Denmark is quite clear.

There is also very important information concerning the dating of broad trapezes. Next to the settlement Revelmose Nord, located in the area of the river Gudenaa, a trapeze of type 4 was found in a refuse layer lodged in gyttja.¹⁰¹ Pollen-analysis indicates that the refuse layer was deposited during the Boreal period and the beginning of the Atlantic period. The trapeze, in contrast, is from the central part of the pollen

zone VI and thus contemporaneous with Svaerdborg I.¹⁰²

Investigations in Brovst near the Limfjorden documented oblique arrowheads with concave retouch in stratigraphical position.¹⁰³ The layer in which concavely retouched trapezes were found in combination with transverse arrowheads was C 14 dated to between 4730 ± 150 b.c. and 4470 ± 130 b.c.¹⁰⁴ This trapeze type may on the basis of its dating be regarded as a further developed oblique arrowhead.

A broad trapeze of type 4 is also documented at the settlement Bøllund in western Jutland dated to the Early Maglemose Culture.¹⁰⁵ However, this settlement contains in all likelihood artefacts from several, temporally differentiated settlements.¹⁰⁶

13. West Sweden and South Norway

The chronology of the Mesolithic in West Sweden which had been established by Fredsjö became through Cullberg's and Welinder's works the subject of a sometimes quite heated debate.¹⁰⁷ This reawakened interest in the West Coast was aroused by new results of investigations of alterations in sea-level during the Post Glacial period.¹⁰⁸ In spite of this, some of the insecurity factors as to the validity of the sea-level curve regarding the part of the West Coast discussed here still remain. This section is 100 km long and exhibits obvious differences in land risings, which may jeopardize the identification of less pronounced transgressions. Here, we shall only throw light on the chronology of the time span being parallel to the pollen zones BO 2 and AT 1.

According to Persson, this period encompasses a somewhat insecurely documented regression - Q^0 - around 6000 b.c. which is preceded by one or two transgressions.¹⁰⁹ Mörner also distinguishes a transgression which he calls ALV-3.¹¹⁰ Around 5800 b.c. a new transgression began, reaching its maximum ca 5200 b.c. - the Post glacial maximum of transgression abbreviated to PG - by Persson called K IV and equivalent to Mörner's PTM-2.¹¹¹ Therefore, all settlements overlain by this transgression can definitely be determined as being older than ca 5200 b.c.

The question how much older a settlement of this kind is can be answered with the help of the two different methods of correlation. As sometimes is the case, other transgression layers may over- or underlie the settlement layer. In such cases it is possible to correlate the transgression layers with the earlier alterations in sea-level, determined by Persson and Mörner. Cullberg is sceptical of the relevancy of this method while Welinder uses it in more than one case.¹¹²

These two authors' attitude towards the other method, that is, to date with the help of artefacts, shows divergencies in several cases. Welinder presupposes a typological development of artefacts on the West Coast that is nearly synchronous with that of South Sweden.¹¹³ Accordingly, the dating of a given artefact obtained in South Sweden would automatically be valid for the West Coast too. Cullberg, on the other hand, although he makes use of the South Scandinavian chronology, does not opine that it corresponds to every phase of the West Swedish development.¹¹⁴ One of the most important questions in this connection will be whether one or several elements of the Late Maglemose Culture can be documented in settlements overlain by the PG. The Lihult Culture, identified by previous scholars, is according to Welinder characterized by core axes dominating over flake axes, more blade scrapers than flake scrapers and the occurrence of stone axes of Lihult type, adzes and the handle-core.¹¹⁵ Of the artefacts enumerated here only the introduction phase of the handle-core is dated with some measure of certainty in South Scandinavia. Welinder believes to be able to document handle-cores at three settlements overlain by the PG.¹¹⁶ Cullberg on his part points out the dubiousness of the stratigraphic position of these three finds.¹¹⁷ But this again would mean that the artefact equipment characteristic of the Lihult Culture would not occur before 5200 b.c. In other words, the introduction of the handle-core would have arrived - at least in the Gothenburg area - 1000 years later than in South Sweden - certainly a remarkable retardation. Thus, the appearance of handle-cores in coastal settlements is not ascertained before 5200 b.c. However, handle-cores also occur in settlements situated at higher altitudes than the PG, in which cases the alterations of the coast line cannot be used for dating.¹¹⁸ Here, radiometric datings would be the right tool - such, however, are nonexistent.

The Sandarna Culture existed before the PG. Its most typical features are the dominance of core axes over flake axes, more flake scrapers than blade scrapers, lanceolate microliths and single barbed flint points.¹¹⁹ Micro-blades are struck from i.a. concical micro-blade cores. Neither Cullberg nor Welinder has tried to divide the culture, calculated to have lasted more than 2000 years, in detail. However, C 14 datings from settlements of the Sandarna Culture are not completely lacking.

During the years 1970 and 1971 a settlement at Bua Västergård south of Gothenburg was investigated and yielded remains of vertebrates, which occur rarely only in coastal settlements on the West Coast.¹²⁰ According to the interim geological report, the artefacts are in a secondary position after having been washed down from a higher altitude during the shoreline alteration of the PG.¹²¹ The bone material found at the site comprising i.a. seal and salt water fish is a primary proof of the marine environment having

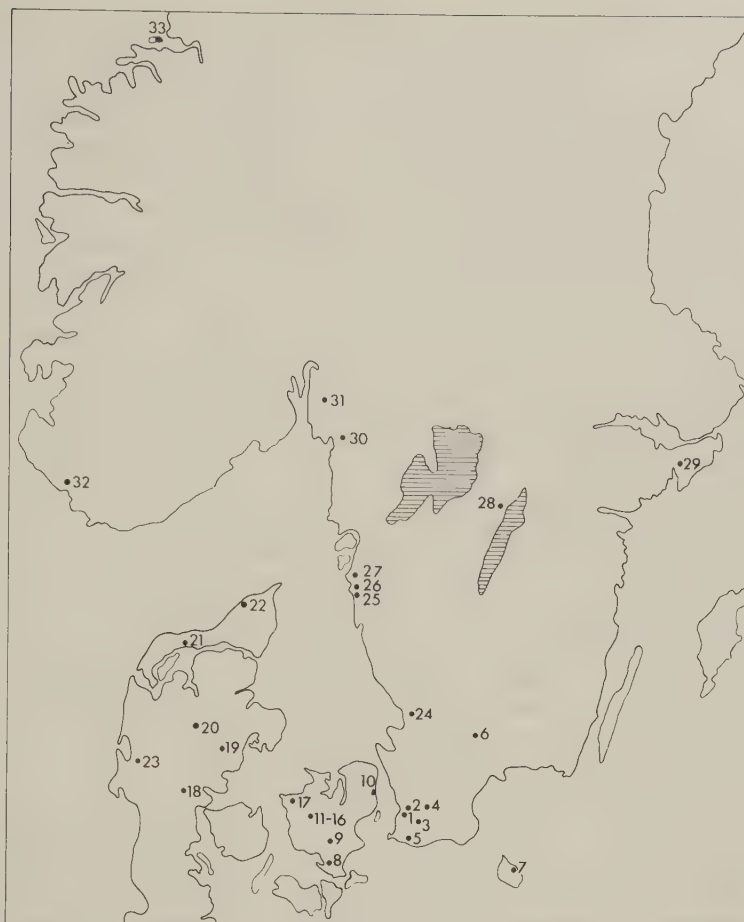


Fig. 92. Sites in Scandinavia mentioned in the text.

1: Segebro, 2: Arlöf, 3: Svenstorp, 4: Revinge mosse, 5: Åmossen, 6: Lilla Loshults mosse, 7: Nr. Sandegaard, 8: Sværdborg, 9: Holmegaard, 10: Vedbæk, 11: Kongsted, 12: Maglø, 13: Ulkestrup, 14: Verup, 15: Øgaarden, 16: Maglelyng, 17: Gammelrands mose, 18: Springbjerg, 19: Klosterlund, 20: Revelsmose Nord, 21: Brovst, 22: Horne, 23: Bøllund, 24: Karsefors, 25: Bua Västergård, 26: Hasslingehult, 27: Tuve, 28: Nolgården, 29: Sjövreten, 30: Tørkop, 31: Kjelås, 32: Lego and 33: Dysvikja.

been an important source of subsistence for the settlers.¹²² Consequently, the settlement is thought to have been directly connected with the shoreline. Moreover, the topography clearly shows that this was the case during the entire Boreal period. Optimal conditions existed during the regression ALV-1 closing ca 7200 b.c. and ALV-3, estimated to have lasted from 6300 to 5800 b.c.

The find material which is characteristic of the Sandarna Culture contains such type specimens as single barbed flint points, lanceolates and core axes as well as specialized cores such as conical micro-blade cores.¹²³ If we accept the South Swedish provenience of these cores, settlement has taken place after 6300 b.c. But with our present knowledge of the West Swedish cultural development during the Boreal period it would be impossible to decide whether the finds from Bua were deposited during a short settlement phase or consist of a conglomerate of several, temporally separated settlements. Five C 14 assays span the interval 5735-4435 b.c.¹²⁴ A difference of 1300 years unquestionably indicates a secondary effect on the samples, especially as they were gathered from a layer which was definitely overlain during the PG. Wigforss seeks the explanation of the varying dates in a presumed admixture of younger, humified material. But the question still remains to what extent younger components had changed the results and whether all or only some of the samples had been affected to an equal degree. Further readings resulted in dating the settlement as being older than the PG.¹²⁵

In contrast to Bua, the settlement at Hasslingehult yielded no single barbed flint points or specialized micro-blade cores.¹²⁶ There, the find material shows an explicit dominance of micro-types. This may be a consequence of the deposition process sorting the flints mechanically.¹²⁷ The geological investigation indicates that the artefact-producing layer was deposited during the ALV-3 and the transgression up to the PG. The three C 14 dates are also in good agreement with the geological dating.¹²⁸ Since the dates are between 5805 ± 215 b.c. and 5510 ± 100 b.c., it is conceivable that Bua and Hasslingehult are by and large contemporaneous, always presupposing that both are regarded as find contexts deposited during a settle-

ment phase. The difference between them may either be caused by different depositional conditions or by a certain temporal difference, in which case Bua would be the younger of the two.

Greatest caution is to be recommended in comparative studies of the microlith types from the West Coast and Scania and Denmark respectively. It may now be said to be quite clear that the type frequency of microliths of these regions is highly divergent. Here, we primarily have in mind the insignificant number of triangle microliths encountered on the West Coast, which is in no way in proportion to what could be expected, should the development of microliths go along the same lines as in South Sweden. Welinder regards the presence of single barbed flint points as an explanation of the absence of triangle microliths. According to him, the flint type would have functioned as a combination of barb and point.¹²⁹ Thus, a microlith set consisting of barbed single points might have been in use in the Atlantic period.

Welinder gives an account of Early Post Glacial finds of single barbed flint points.¹³⁰ They are also represented in the Late Maglemose Culture, albeit few in number. In the WL at Ageröd I:HC there is one microlith with a marked barb.¹³¹ In Ageröd I:B and Ageröd I:D the type does not occur. Other settlements in the Ringsjö basin with mixed material such as Rönneholm I and Bollamöllan also yielded single barbed flint points.¹³² Thus, the find from Ageröd:HC, WL alone indicates that single barbed points were present in the Late Maglemose Culture in South Sweden.

Cullberg considers even the pecked stone axe as a type specimen of the Sandarna Culture.¹³³ The pecked stone axe and the single barbed flint point would thus be the implements that are direct parallels to the South Swedish artefact set. The pecked stone axe could, although with reservation, be described as a type specimen of the Late Maglemose Culture.

Similarities occurring in the two areas during the more than 2000 years that the Maglemose and Sandarna Cultures respectively lasted, cannot be interpreted as a development along parallel lines. That this was not the case is exemplified above. Furthermore, there are types of stone axes on the West Coast which are unknown in South Sweden. To what degree these differences are conditioned by environmental factors, access to raw material or dissimilar influences from outside, is a problem extremely difficult to solve. During the older phase of the Mesolithic cultural development, certain parallels to South Norwegian material exist.¹³⁴ Therefore we should not exclude the possibility that impulses coming from the north may well have been just as strong as those coming from the south. A decorated mattock of reindeer antler found at Ageröd I:HC, BL has been interpreted as a conceivable contact between the South Norwegian mountain area and South Sweden.¹³⁵

Subject literature concerning Mesolithic cultural development in West Sweden only rarely contains discussions about cultural continuity existing between the Sandarna and Lihult Cultures.¹³⁶ The settlement finds that we have today reflect a Sandarna Culture which presumably lasted some time into the Early Atlantic period, with certain chronologically conditioned phenomena, such as the introduction of conical micro-blade cores. The Lihult Culture seems to have an inventory which remained essentially unchanged for a good 1000 years. Even in settlements which are dated to a time shortly after the PG, the Lihult Culture appears fully developed. Likewise, within the Sandarna Culture, no definite intermediate forms are distinguishable. Therefore, an intermediate stage should be looked for in connection with the transgression prior to the maximal stage. It remains to be seen whether any settlements containing intermediate types can be found in the coastal belt with its find-producing layers overlain by transgression, in unaffected find sites overlying the highest PG or in find sites of the interior.

Finds from Karsefors near the river Lagan in southern Halland contribute an interesting element to the diffusion of broad trapezes.¹³⁷ The settlement yielded artefacts from the Boreal as well as the Atlantic period - triangle microliths, oblique arrowheads, transverse arrowheads and handle-cores. The context also includes two examples of type 4 trapezes.¹³⁸ These examples are the northern-most finds of this type of artefact.

Recent research results in Norway must be seen as important contributions to an understanding of cultural development in South Sweden during the end of the sixth and the beginning of the fifth millennium. Attention is primarily focused on Østfold and Akerhus, i. e., the region between the Swedish border and the Oslo fjord. There, Mikkelsen has found a group of settlements which do not seem to fit into the generally accepted picture of the South Norwegian Mesolithic.¹³⁹

Tørkop, close to the Swedish border, and Kjølås II further to the north are sites where archaeological investigations were carried out during recent years. Both exhibit specialized micro-blade cores, including handle-cores. Thus far they remind one of the settlement finds of the Nøstved Culture, but they lack other artefacts characteristic of that culture. Nor are there any noticeable close ties to the Fosna Culture.

The most remarkable feature is the absence of microliths. Tørkop is the only site where this type is represented as a definitely identified single barbed flint point, conceivably indicative of close contacts to West Swedish localities. The inventory of these sites which includes conical micro-blade cores and handle-cores puts them closest to the South Scandinavian development. Mikkelsen interprets the finds as deposited during a short phase. From Tørkop moreover we have a C 14 reading of 6230 ± 170 b.c.¹⁴⁰ This date seems quite early considering the above chronology of the West Coast's Mesolithic. When the

two above-mentioned sites are dated by means of transgression data, the variation in time will be 6300-5400 b.c.¹⁴¹ This would mean that the introduction of the handle-core took place earlier in South Norway than on the Swedish West Coast - a most important piece of information.

If the Tørkop settlement were ranged within the West Swedish cultural development, it should be labeled a Sandarna settlement including younger elements - handle core - and a high frequency of blade scrapers. In this conjunction, the PG in the Gothenburg area is an eminent factor. It constitutes an important terminus ante quem in the study of coastal settlement. In South Norway isostasy was more active than eustasy throughout prehistory, hence no dislocation of settlements took place. Consequently, it is quite possible that the South Norwegian sites offer a more detailed picture of cultural changes than what can be observed on West Swedish sites.

Find materials that can neither be ranged into the scope of the Fosna nor the Nøstved Cultures were also excavated in Dysvikja on Fjørtoft and at Lego in Jaeren.¹⁴² Both settlements are covered with transgression layers. The finds include conical micro-blade cores. Triangle and narrow trapeze microliths as well as stone axes occur in Lego, but are lacking in Dysvikja. A pollen-analysis of the layer capping the Lego settlement gives a Late Atlantic pollen spectrum. However, this only gives a terminus ante quem and not a date for the artefact-producing layer.¹⁴³ Dysvikja on the other hand was dated by both pollen-analysis and C 14 assays.¹⁴⁴ The former results in the variation 6500-5300 b.c., the latter in 6100-5600 b.c.

The Norwegian settlements are highly valuable for an interpretation of the influence of South Swedish and Danish artefact changes on regions lying outside their traditionally acknowledged sphere of influence. Moreover, it should be possible to use these South Norwegian finds when discussing the Mesolithic cultural development on the Swedish West Coast.

14. Mesolithic depot finds

In analyzing prehistoric social structure, the treatment of depot finds of the Neolithic, the Bronze Age and the Iron Age serves as a useful pointer. If depots did not play a similarly important role in Mesolithic research, this is due to the simple fact that they are few in number and for this reason have rarely been given due consideration. They should nonetheless not be neglected, since they not only confirm a tradition but also widen the scope of human activity in a pre-agrarian society, cf. the depot of narrow microliths from Ageröd I:B.

In the course of an investigation of some Mesolithic pits within a large Early Neolithic settlement complex at Svenstorp in south-western Scania, 10 flints, i.e., 7 blades, 1 blade fragment and 2 flakes, lying close together, were found.¹⁴⁵ All flints save one lay within a 10 cm long and 3 cm wide area. Some flints lay with their ventral face upwards, others the other way round. The position of these flints closely resembles the microlith depot from Section B. In consideration of the position of the flints, Salomonsson opines that they were either tied together or wrapped in some perishable material. He also thinks that the find is proof of a conscious principle of selection.

Two arrows from the bog of Lilla Loshults Mosse in northern Scania which were encountered at a depth of 2 m lying close to each other, may also be interpreted as a depot find.¹⁴⁶ They are dated to the Early Boreal period.¹⁴⁷

Conceivably the two bone points from Nolgården in Västergötland found during the regulation of the water system may also be regarded as a depot find, in spite of the fact that the points lay at a distance of ca 1 m from each other.¹⁴⁸ The find consists of a slotted bone point and a bone point with barbs arrayed in pairs, possibly constituting an imitation of a slotted bone point.¹⁴⁹

The bog of Åmossen in south-west Scania yielded a great number of slotted bone points. According to certain, although unconfirmed information, some of the items were encountered together.¹⁵⁰ In contrast to similar bone points excavated at settlement sites, these items are undamaged. Two points of bone which Salomonsson considers pins for garments might also be a depot. They were found together in the bog Revinge Mosse in central Scania.¹⁵¹

A find from central Sweden which is also described as a depot, consists of two stone axes. They were found lying close together at the settlement site Sjövreten in Sörmland, dated to the fifth millennium.¹⁵² Equally interpreted as a depot is a find excavated next to a large rock above a Mesolithic settlement located at Tuve 18 in the Gothenburg area. It consists of 3 core axes, 1 stone axe and 45 bulbar flakes and flakes of flint, greenstone and quartz.¹⁵³

Coming to Denmark, there are several cases where artefacts were found in close company in bogs. Still, the majority of these should best not be regarded as depot finds since almost all of them were taken from the ground without any expert archaeological assistance. Most of them are in all likelihood settlement finds with only the more obvious objects having been safeguarded. Others again might derive from composite tools.

The question whether a Mesolithic find should be interpreted as a depot find or not is made more difficult to answer by the fact that Mesolithic man used the environment in question, namely the bogs, for different activities, whereas these areas served during the rest of prehistory only as a repository. When dealing with allegedly Mesolithic depot finds, a far more complete documentation of the find circumstances has to be called for than what is customary in research in connection with other periods. As an example we may mention that Danish find sites containing up to 19 barbed points of Mullerup type have been interpreted by Mathiassen as frequented fishing stations where fishing equipment was accidentally lost.¹⁵⁴

One of these finds certainly seems to be a depot, namely the find from Horne in Vendsyssel, consisting of five leister prongs found tied with bast.¹⁵⁵

A find from the bog Gammelrand Mose on Zealand was also interpreted as a depot find. It consisted of an axe of red deer antler with a shaft-hole, an axe of bone with a shaft socket made of a metatarsal of aurochs and a cut-off part of a beam of elk antler. The objects lay closely packed and were covered by a large core of flint 1.5 m deep in the peat.¹⁵⁶ The bone axe with shaft socket dates the depot to the Maglemose period.¹⁵⁷

During the investigation of an Iron Age gravefield at Nr Sandegaard, several flint concentrations containing Maglemosian artefacts came to light.¹⁵⁸ Within an area of a couple of square metres, called Nr Sandegaard V, 81 flints were encountered, of which 23 were dressed - 2 had scraping edges.¹⁵⁹ The flints lay within an area measuring 0.25 x 0.22 m² and up to 0.10 m thick. It could also be observed that the flints had been placed in a small pit. Becker considers it fully assured that the flints are contemporaneous with the Mesolithic settlement on the site.

At the investigation of field C in Svaerdborg I eight tightly packed microliths were found. Four of these were arranged in a fan. The eight microliths are of different types and both isosceles and scalene triangles are represented.¹⁶⁰

Another find which may be considered a depot consists of 2 core axes, 2 atypical flake axes, 2 cores, 1 core scraper and an unworked flint nodule found at the edge of a gravel pit in Maglelyng on north-western Zealand. The other flints are said to have been grouped around the flint nodule.¹⁶¹

When a hole for a pump was dug in the settlement Vedbæk Boldbaner two or several slotted bone points were found closely packed.¹⁶² Similar finds of several slotted bone points lying together were reported from bogs on Zealand.

There are both sacrificial offerings and hoarded treasures among the finds enumerated here. Some of these finds have to be assigned to the latter category first of all those which were encountered on solid ground, e.g. the finds from Nr Sandegaard, Svenstorp and Maglelyng. The arrows from the bog of Lilla Loshults Mosse and the finds from Gammelrand Mose and Horne may be considered sacrificial offerings. Particularly interesting are those finds which were described as having been tied or wrapped, or whose position indicated some sort of container.

No intentional breaking of the objects such as was registered in the depot from Ageröd I:B was documented. Something similar was observed in the grave of a man in Janislawice in Poland - the grave contained microliths and bone points broken apart. As indicated by find circumstances, the objects must have been broken apart when the burial took place.¹⁶³

15. The southern coast of the Baltic

In regard to the Mesolithic in north-western Germany, Schwabedissen's results dealing with the region spreading from the Baltic coast in the north to the Mittelgebirge in the south, published in 1944, are still our best source.¹⁶⁴ The basis of the work is a partition into two areas; a north-western, where flint axes are absent, and a northern, axe-producing area.¹⁶⁵ Within them, the typological changes do not occur quite synchronously. The north-western area consists of North Germany west of the Elbe, while the northern area lies to its east and north.

In the north-western area four phases - Kirchdorf, Haltern, Boberg and Hülster - are differentiated in chronological succession.¹⁶⁶ The first and second phases represent primarily triangle microliths, isosceles dominating, and so-called Zonhoven points. The Boberg phase is characterized by long and narrow microliths and broad trapezes. Other artefact forms to be noted are small round flake scrapers and triangle microliths of a size different from the majority, so-called Klein-Dreiecken. Proof of a possibly subsequent Hülster phase is somewhat unconvincing.

Three successive phases - Duvensee, Oldesloe and Ellerbek - constitute the earlier Stone Age of the northern area.¹⁶⁷ Like most other scholars, Schwabedissen equates Duvensee with the older Maglemose Culture while paralleling the Ellerbeck phase with the Ertebølle Culture.¹⁶⁸

The Oldesloe phase, between these two, is characterized by broad microliths. They are also documented in a few settlement finds from the Duvensee phase, but Schwabedissen questions the chronological homogeneity of these materials.¹⁶⁹ Going by the scheme set up about which flint types belong to which phase,

the handle-core, in the treatment called a type of scraper, would already exist in Duvensee.¹⁷⁰ But the recorded objects cannot be ranged with handle-cores according to definition, and for this reason the form is not documented before the Oldesloe phase. Several of the microlith forms such as the Zonhoven points and isosceles triangle microliths are entirely absent and are replaced by long and narrow microliths. The relation of core axes to flake axes alters essentially. In Duvensee the relative value of flake axes is 12%, while in Oldesloe it varies from 65% to 75%.

The Oldesloe phase is interesting, among other things, because some scholars want to range the settlement contexts of Ageröd I:B and Ageröd I:D in this phase.¹⁷¹ Only exceptionally have settlements from the Oldesloe phase locations where we would expect to find preserved organic material. Among the artefact-producing layers in the periphery of the bog Satruper Moor in Schleswig two sites, Fasaneninsel and Rüste 2 belong to the phase in question.¹⁷² Conditions for preservation were optimal at Rüste 2, so that points, chisels, and axes of antler and bone as well as paddle blades, lance and arrow shafts of wood were found preserved. In the short publication on the finds type 3 and 4 trapezes are illustrated.¹⁷³ Fasaneninsel was C 14 dated to ca 4200 b.c.¹⁷⁴

Althin, who knew of still unpublished material, mentioned a settlement - Boksee - in the vicinity of Kiel which was pollen-analytically dated to the transition from the Boreal to the Atlantic periods.¹⁷⁵ Among the artefacts to be noted are core and flake axes, handle-cores and narrow and broad trapezes, which to Althin suggest a correlation between Boksee and Ageröd I:D. According to Schwabedissen, Boksee is part of a group with contacts to the Maglemose Culture and has to be divorced from the Duvensee phase.¹⁷⁶

Bokelmann is of the opinion that there are various phases within the period he defines as the Oldesloe Culture.¹⁷⁷ The inventory from a previous stage would contain long and narrow triangle microliths, but lack broad trapezes. An intermediate phase, into which the majority of settlement finds may be ranged, is characterized by those artefacts which Schwabedissen assigns to the Oldesloe phase. The youngest phase is represented by settlement material containing a high percentage of trapeze types in relation to other microliths. The settlements Rüste 2 and Fasaneninsel belong to this later phase. In one of the settlements investigated by Bokelmann - Dosenmoor - both long and narrow triangle microliths and trapezes are present.¹⁷⁸ Due to its location in the periphery of a bog, the settlement could be correlated with artefact-producing organogen sediment. Pollen-analytically the settlement is dated - although with some doubt - to have been deposited at the latest during the transition between the Boreal and the Atlantic periods.¹⁷⁹ However, in the chronological evaluation the problem of dating the zone borderline between the Boreal and the Atlantic periods still remains. Referring to British radiometric assays, this borderline was set at 5500 b.c. in North Germany.¹⁸⁰

Gramsch treated the Mesolithic finds from the territory of the German Democratic Republic in detail.¹⁸¹ He separates the Mesolithic into an early and a late phase. Within the Early Mesolithic, Gramsch distinguishes in Mecklenburg and Brandenburg a Duvensee group having characteristics according to Schwabedissen's system.¹⁸² A minor number of find sites in north-eastern Mecklenburg with elongated lanceolates and triangle microliths are regarded as parallel to the Maglemose Culture. Within the Duvensee group a sub-group - the Fiener group - is distinguished in southern Brandenburg. It has a partly differing set of microliths, i. a. a high percentage of lanceolates with retouch on the base. According to a dubious pollen-analysis this sub-group was dated to the transition between the Boreal and the Atlantic periods.¹⁸³ A large amount of Mullerup type barbed points, by Gramsch called points of Pritzerberg type, show a marked concentration to the distribution area of the Fiener sub-group. For this reason, this particular barbed point is considered to be a type specimen of a late part of Early Mesolithic.¹⁸⁴

Gramsch divides the large number of Late Mesolithic sites into four regional groups: Oldesloe-Kobrow, Ahlbeck, Jühndorf and Lietzow, the latter also called Ertebølle-Ellerbeck Culture. The chronological relations of these groups are, save for the last, very uncertain, but Gramsch thinks that the first three existed synchronously.¹⁸⁵ The Oldesloe-Kobrow group in western and central Mecklenburg can be equated to the Oldesloe phase in North Germany. In the archetypical settlement at Kobrow both core axes and flake axes as well as handle-cores are represented. Among the broad trapezes which amount to only 4% of the artefact assemblage, type 1 predominates.¹⁸⁶

The Jühndorf group, located in Brandenburg, is differentiated from the Oldesloe-Kobrow group on the basis of artefacts having smaller dimensions and a somewhat higher percentage of long and narrow triangle microliths.¹⁸⁷

Settlements of the Ahlbeck group are located in eastern Mecklenburg near the Oder.¹⁸⁸ This group is differentiated from the two first-mentioned ones by higher percentages of triangles and broad trapezes, whereas the percentage of axes is considerably lower. A few find materials in Brandenburg from immediately east of the Oder are ranged with the previously mentioned Boberg phase.

A great number of stone artefacts, mainly pecked axes but also objects with shaft-hole are registered in East Germany.¹⁸⁹ By association, the former were deemed to be a Late Mesolithic artefact type which should probably be classed with the Jühndorf group. The implements with shaft-hole include both picks and maces. Both forms occur in the Early Mesolithic site Hohen Viecheln, dated to 6600[±] 145 b.c.¹⁹⁰

Accordingly, the North German artefacts with shaft-hole would be somewhat older than the oldest examples in South Scandinavia. Concerning the shafting of pecked stone axes, a bog find from Berlin-Moabit consisting of an axe fitted into a socket of alder wood with shaft-hole is highly important. Unfortunately, no detailed information about the find is available.¹⁹¹

Mesolithic finds in Polish territory are also divided into an Early Mesolithic and a Late Mesolithic phase.¹⁹² The older phase is geologically determined to the Pre-Boreal and Boreal period, the younger phase to the Atlantic period, the borderline at ca 6000 b.c. But the radiometric datings are extremely few in number.

The majority of Early Mesolithic settlements belong to the Komornica Culture, documented primarily in central and southern Poland. A few culture layers are associated with organic sediments. Pollen-analyses taken from these indicate that the Komornica context may have existed as late as during the Atlantic period.¹⁹³ The settlement Calowanie in central Poland has both Late Paleolithic and Mesolithic find-producing layers documented in a stratigraphical succession of overgrowth.¹⁹⁴ A C 14 sample taken from an upper layer belonging to the Komornica Culture furnished the date 6410 ± 75 b.c.¹⁹⁵

The Late Mesolithic Janislawice Culture has a similar distribution pattern to the above-mentioned, with the addition of further find sites east of the Vistula.¹⁹⁶ Lanceolates with retouch on their base and elongated triangles predominate. Broad microliths are represented by types 1 and 2. Conceivably, the Janislawice Culture has had an Early Mesolithic, preceding stage without trapezes, although most of the settlements do have them. Just as in the Komornica Culture, flint axes occur sporadically. In central and northern Poland there are contexts including elongated triangles, symmetrical trapezes and axes, which are associated with the Chojnice-Piński Culture. This culture in turn is set in association with the above-mentioned East German Jühnsdorf group, and even with, i. a., Ageröd I:B.¹⁹⁷ No artefacts made of organic material pertaining to the two latter, essentially Late Mesolithic cultures were found at settlement sites, although both slotted bone points and barbed points of Mullerup type as well as coarser points of antler and bone were in use. This is documented by the distribution pattern of antler and bone stray finds and the grave of a man at Janislawice.¹⁹⁸ Artefacts with shaft-hole are probably also to be referred to the Janislawice Culture.¹⁹⁹

North-western Poland, where it could be expected to find traces of contacts with the north, has to be regarded as a generally still-neglected region. Very few sites were investigated here. Material gathered from the ground surface near Plawecino includes handle-cores, thus demarcating the easternmost distribution of this type of core.²⁰⁰

An analysis by Kobusiewicz of the Polish flint axes may be regarded as an important contribution for setting up the limits of Schwabedissen's axe-producing northern area.²⁰¹ The axes are distributed within central Poland with a concentration in the western region. The distribution pattern may to a certain extent reflect the extremely varying excavation intensity, but is probably by and large correct. With the exception of two examples all axes are made of Baltic flint from the North Polish morains. It should be noted that other artefacts from sites containing axes are not made of Baltic flint. Only 1/3 of the axes deriving from settlement sites are from the Late Mesolithic. The relation of core axes to flake axes seems to be the same during the whole Mesolithic, namely 1/1.

16. Western Europe

The information provided by the Quaternary biological investigations about the Holocene development of the Netherlands could not be used for purposes of dating settlements from the period in question.²⁰² The settlements are often located on wide dunes close to open water. Layers of eventual organic deposits are too far away from the occupational area proper for artefacts to have been lost or discarded and consequently preserved there. However, in contrast to previously described regions, there a considerable number of C 14 dates from the Netherlands Mesolithic. They are very important for stabilizing the chronology based on typological grounds.

Taking the Netherlands finds, a thorough typological treatment and a minor number of C 14 datings as a basis, Bohmers set up a chronology for continental North-West Europe.²⁰³ He distinguished four, possibly five groups. Only one of these, called De Leinen after an eponymous site, was shown by C 14 datings to be essentially younger than the rest, which were dated within the interval 6020-5360 b.c.

Discovery of further sites and new radiometric readings brought forth a more nuanced picture of the Netherlands Mesolithic.²⁰⁴ It now appears divided into a northern and a southern settlement region, because Newell considers differences in access to raw materials, techniques and microlith types so great that the two regions should be treated separately. The northern finds are in harmony with Schwabedissen's chronology and may thus be assigned to the north-western area, abbreviated by Newell to N. W. K. The southern sites show affinities to the Mesolithic of Rhineland.²⁰⁵

According to Newell, the northern parts of the country exhibit a documentable ongoing alteration of the

artefact assemblage which can be divided into Early Mesolithic, Boreal and Late Mesolithic N.W.K.. Parallel to the De Leinen-Wartena complex, an offshoot of N.W.K. survives. The difference between Boreal and Late Mesolithic N.W.K. is marked by the introduction of broad microliths. The older forms do not disappear, but a minor change in frequency with an increased percentage of scalene triangles and a diminishing number of certain flint points with retouch on the base is observable.²⁰⁶ Four datings from three settlements of the Boreal N.W.K. were determined, giving the time span 6110 ± 75 - 5750 ± 70 b.c.²⁰⁷ Six settlements representing the Late Mesolithic N.W.K. were dated to 5925 ± 90 - 5080 ± 160 b.c.²⁰⁸ The difference in time is in fact less, since only one sample gave a central value younger than 5500 b.c. The datings indicate a chronologic division of the two stages. The introduction of broad microliths might be dated to ca 5800 b.c. in the N.W.K.

The De Leinen-Wartena complex shows obvious changes in relation to the Late Mesolithic N.W.K.²⁰⁹ Certain lanceolate types are missing, and there are frequency differences between the microlith types. Broad trapezes keep the same percentage, while other artefact types, inter alia scrapers and retouched micro-blades, show divergencies. But the most interesting feature is the occurrence of core and flake axes in an environment which earlier was lacking in axes. C 14 readings from settlements belonging to the De Leinen-Wartena complex give the dates 5800 ± 75 - 4845 ± 70 b.c.²¹⁰

The radiometric reading that could be taken from a surviving Late Mesolithic sample of the N.W.K. gave a date which is in agreement with those from the De Leinen-Wartena complex - 4710 ± 90 b.c.²¹¹ The latter was interpreted as a migration of people who had to leave their former home because transgression had flooded the region extending between England and Jutland.²¹²

In trying to elucidate contacts between continental and Scanian material, the Late Mesolithic development in the northern Netherlands is of great value, since information from other northern regions of the Continent is defective and not enough to effectively support the chronology based on typology. The De Leinen-Wartena complex has also been paralleled to the North German Oldesloe Culture.²¹³ For this reason the author has tried to find further information there.²¹⁴

The settlement sites Drouwener Zand and Duurswoude I are from the Late Mesolithic phase of the N.W.K.. Both materials are relatively small - less than 100 tools in each - and the number of broad microliths is very limited. Duurswoude I contains only 3 trapezes, 2 of type 2 and 1 of type 4. The other microlith types, about 25 examples, exhibit wide variation with isosceles and scalene triangles and Zonhoven flint points. The number of broad microliths from Drouwener Zand is somewhat larger, 9 examples, in the following distribution: type 2: 2, type 3: 1, type 4: 5 and type 5: 1. As at Ageröd I:B and Ageröd I:D, type 4 is represented by the highest number, but the morphological variation among the trapezes is very obvious. The same is true of the rest of the microliths of the same type as in Duurswoude I. Micro-burins of a size which may result from trapeze production are documented.

Settlements of the De Leinen-Wartena complex are considerably larger both in the number of artefacts and in extent. The number of intact broad microliths from the eponymous settlement De Leinen is 73 with the following distribution: type 1: 2 (3%), type 2: 14 (19%), type 3: 16 (22%), type 4: 37 (51%) and type 5: 4 (5%). In consideration of the absolute values, the difference between the De Leinen-Wartena and the N.W.K. is relatively minor.

In the South Netherland material a bipartition in a Boreal and a Late Mesolithic group was made. The Boreal group had C 14 readings between 6260 ± 75 b.c. and 5360 ± 85 b.c.²¹⁵ The Late Mesolithic group is dated to 5835 ± 50 and 5030 ± 105 b.c.²¹⁶ As corroborated by C 14 readings, trapeze types seem to have been introduced at about the same time both in the north and in the south. The De Leinen complex is not documented in the southern area.

Newell completed the here described difference between the Late Mesolithic N.W.K. and the De Leinen-Wartena complex with a study of number, size and location of the settlements.²¹⁷ Results of these investigations became a model of Late Mesolithic settlement pattern and demography. During Pre-Boreal and Boreal times, i.e. up to ca 6000 b.c., a minor increase in the number of settlements per temporal unit may be seen. The number of settlements from the later part of the Mesolithic, i.e. the Atlantic phase, is so great that they cannot be brought in relation to the state of affairs as seen in the Early Mesolithic development. The population appears to have multiplied. According to Newell there is a noticeable difference between the Late Mesolithic N.W.K. and the De Leinen-Wartena complex during the Late Mesolithic, both in material culture and size and distribution of settlement. Within the N.W.K. he is able to trace settlements of various sizes, where the maximal extent is 1,000 m². Within the De Leinen-Wartena complex several settlements extend over a ground surface of between 1,800 m² and 2,600 m². Even though there are 22 large settlements in the N.W.K., compared with the 7 from the De Leinen-Wartena complex, the above-mentioned values should make the difference between the two groups perfectly clear. In addition, there is an obvious difference in the number of tools per settlement which is in no relation to surface unit. The highest number of tools is 0.4 per square metre in the N.W.K. and the lowest is 2.1 per square metre, in the De Leinen-Wartena complex. The topographic location of the two groups is also different. The settlements of the former group were preferably built on high, sandy ridges next to bodies of water that are now overgrown. The settlements of the latter group are located in areas which

today are still close to the sea, lakes or rivers.

In England, scholars grappled for several decades with problems concerning chronological relationships between finds of South Scandinavian cultural affinity and continental impetus respectively. By making use of both pollen-analyses and C 14 dating, a systematization of Mesolithic development primarily in south-eastern England and East Anglia has been achieved.²¹⁸ The English Mesolithic can be divided into an older and a younger phase.²¹⁹ The borderline was set at ca 6500 b.c., based partly on settlement datings but also on the fact that the sea-level rose at that time. Extensive lands of the previously supramarine North-Sea region became submerged. At about the same time the land-bridge connecting south-eastern England and the Continent was broken by the rising sea.²²⁰

Early Mesolithic settlements characteristically contain only a limited number of microlith types - lanceolates with one-sided retouch and triangles. They are quite wide, measuring 0.1-1.2 cm. After ca 6500 b.c. find materials are dominated by microlith types whose width does not exceed 0.6 cm.²²¹ Certain older types survive in south-eastern England. The most frequently occurring types are scalene triangles and trapezes as well as micro-blades with one-sided retouch. That there is a chronological difference between the two phases is exemplified by the stratigraphic division of the South Anglian site Wawcott III.²²² Find sites dated to the Early Mesolithic are advanced to belong to the Maglemose Culture or to have proto-Maglemose character. Radiometrically they were dated to between 8400 b.c. and 7500 b.c.; pollen-analytically all are older than period VII, i.e., from before 5500 b.c.²²³

The oldest settlement with narrow microliths, Pilpoke Beacon near Durham, was dated to 6810 ± 140 b.c. Another seven settlements delivered readings from 6150 ± 150 b.c. to 3310 ± 130 b.c.²²⁴ The cultural affiliation of the two microliths from Stump Cross, assigned the radiometric date 6500 ± 310 b.c., cannot be assured.²²⁵ A few settlements located in the southern part of the Pennine Chain may be ranged in this period.²²⁶ In Broomhead Moor, dated to 6623 ± 110 b.c., the scalene triangle types are represented in combination with isosceles triangles.²²⁷ The number of retouched microliths is also relatively small. Another settlement with similar material, Warcock Hill, gave the date 6656 ± 110 b.c.²²⁸

As Clark has pointed out, the microlith assemblage of the phase shows several similarities to continental finds, foremost to artefact assemblages from Belgium and the South Netherlands.²²⁹ But at the same time the material also includes elements which set the English cultural development apart from that of the Continent.

A number of settlements contain flint axes. Their occurrence during the Early Mesolithic is one of the most important confirmations of the English Maglemose Culture, though their number is far less than in contemporaneous South Scandinavian localities. The percentage in England is about 1%.²³⁰ Nor are flint axes in the Late Mesolithic Horsham Culture in south-eastern England a highly frequent phenomenon.²³¹ This is exemplified by the relation of axes to microliths in Broxbourne - Early Mesolithic - namely 1:12.5, while in Farnham, which is assigned to the Horsham Culture, the relation is 1:46.²³² The Horsham Culture may possibly be viewed as a special group within the Late Mesolithic. All axe-producing settlements are located in south-western England, which also contains a considerable number of Maglemosian Settlements.²³³ A certain difference in microlith types is observable in that axe-producing assemblages have a larger amount of lanceolates with concave, retouched base than those without axes.²³⁴ The Peacock's Farm settlement in Cambridgeshire, containing axes but no lanceolates with concave base, was dated to 5650 ± 150 b.c.²³⁵ This settlement has trapezes too, whose size is equal to that of triangles. Thus, these trapezes are dissimilar to those on the Continent.

When dealing with continental material, the French terms Tardenoisian and Sauveterrian are frequently used, although no generally valid interpretation of them has ever been accepted. The term Tardenoisian has been used for at least three different contexts: it has had a comprehensive meaning describing those Mesolithic settlement sites which are not assigned to the Maglemose Culture.²³⁶ The main criterion in this case was the lack of axes. Clark explains the phenomenon in saying that there was no need for axes in the environment where Tardenoisian settlements were found, namely a terrain of dunes with sparse forest vegetation. For most scholars, the term had chronological meaning. Accordingly, Tardenoisian was a comprehensive denomination of trapeze-producing, continental cultural groups and equivalent to the latest phase of the Mesolithic.²³⁷ Other scholars used the term in comparisons with finds from the settlement at Fère-en-Tardenois in northern France, in which case the term designated those sites which were considered directly affected by alterations of the material culture as they may be traced in the eponymous settlement.²³⁸

Sauveterrian is derived from the settlement at Sauveterre-la-Lemance on the shore of one of the tributaries of the Garonne in south-western France. The term sometimes occurs denominating that phase of the Mesolithic which lacks trapezes.²³⁹ In the following, both terms will only be used in connection with settlement material which typologically may be equated with the two eponymous sites, regardless of the chronological aspect. In applying the terms in this sense, Tardenoisian will encompass Belgium and northern France, while Sauveterrian will include southern France and the Massif Central.²⁴⁰

Two Tardenoisian phases are distinguished. The older of these, lacking broad trapezes, is called



Fig. 93. Sites mentioned in the text. 1: Råde, 2: Fasaneninsel, 3: Boksee, 4: Dosenmoor, 5: Hohen Viecheln, 6: Berlin-Moabit, 7: Plawecino, 8: Calowanie, 9: Janislawice, 10: Drouwener Zand, 11: Duurswoude, 12: de Leinen, 13: Wawcott, 14: Pilpoke Beacon, 15: Star Carr, 16: Stump Cross, 17: Broomhead Moor, 18: Warcoock Hill, 19: Broxbourne, 20: Farnham, 21: Peacock's Farm, 22: Fère-en-Tardenois, 23: La Sablonnière de Coincy, 24: Montbani, 25: Allée Tortue, 26: Sauveterre-la-Lemance, 27: Rouffignac, 28: Ponteau, 29: La Baume de Montclus, 30: Chateauneuf-les-Martique, 31: Gramari, 32: Moita do Sabatiao, 33: Lautereck, 34: Mannlefelsen, 35: Birsmatten-Basisgrotte, 36: Schöts, 37: Romagnano, 38: Vatte di Zambana, 39: Grotta Azurra, 40: Sered, 41: Soroki, 42: Turcului-Dubova, 43: Lepenski Vir, 44: Vlasac, 45: Franchthi and 46: Argissa-Magula.

Coincy after the settlement at La Sablonnière de Coincy, and Montbani - a trapeze-producing phase - after a settlement of the same name.²⁴¹ The characteristic feature of the Coincy phase consists of lanceolate microliths both with and without retouch on the base, isosceles and scalene triangles. Blade scrapers are almost completely absent. The most important differentiating feature of the Montbani phase is the asymmetrical broad microlith, and one important artefact is the so-called Montbani blade, trimmed with forceful retouch. Blade scrapers are represented as well as microlith types of the Coincy phase, although the latter constitute a far lower percentage of the total number of artefacts.

All Tardenoisian settlements are located in open terrain and only a few have stratigraphic divisions of artefact-producing layers. As in the Netherlands, settlements in northern France are also frequently located in dunes and sandy fields. The artefact-producing layer is in several cases covered by a layer of sand of quite considerable thickness. That such stratigraphic sequences may include sediments with pollen deposits is documented, but only minor investigations have so far been conducted.²⁴² Chronology of the phases is based exclusively on the few available C 14 datings. Charcoal samples from La Sablonnière de Coincy II and Montbani II, both belonging to the Coincy phase, gave 6240 ± 190 b.c. and 6110 ± 350 b.c. respectively.²⁴³ These settlements are considered to represent a late stage of the Coincy phase. Unfortunately no C 14 datings from layers containing trapezes are available. One sample from a stratum over-

lying a trapeze-producing horizon next to Montbani II was dated to 4980 ± 170 b.c.²⁴⁴

Rozoy has established a chronology of the Montbani phase on the basis of thorough studies of the material.²⁴⁵ The older part of the Montbani phase is represented by the settlements Montbani 12 and Montbani 13, while Allée Tortue represents the younger stage of the culture. The so-called Danube points which occur there were taken as an indication of Allée Tortue having been settled during a period when the Linear Pottery Culture influenced cultural development in northern France. Earliest proof of the Linear Pottery Culture in France was dated to the second half of the fourth millennium b.c., thus giving a fix point in time for Allée Tortue.²⁴⁶ Most likely though, essential alterations of trapeze types had occurred prior to this date.²⁴⁷

Starting from datings of the Late Coincy phase, the transition Coincy/Montbani was established at ca 6000 b.c.²⁴⁸ Consequently, the Montclus phase would have existed for more than a thousand years. Table LXIII records the finite numbers and percentages of broad microlithis types documented in the three settlements.²⁴⁹

Table LXIII. Percentages of broad microliths from three settlements of northern France.

Type	Montbani 13	%	Montbani 12	%	Allée Tortue	%
1	1	5	23	6	2	2
2	1	5	12	3	3	3
3	3	17	23	6	13	13
4	11	61	285	75	71	73
5	2	11	40	10	9	9
Σ	18	101	383	100	98	100

In evaluating, the manifest difference in number has to be noted. Type 4 has the highest percentage in all three localities. Type 5 shows an almost constant percentage, while types 1-3 vary. But viewed from the South Scandinavian perspective, the differences are still astonishingly minor for representing a phase which lasted more than a millennium. The proportion of trapezes in relation to the total number of artefacts cannot be used as a chronological criterion. The ratio in Montbani 13 is 14%, in Montbani 12, 25% and in Allée Tortue 16%. The decrease of other microlith types manifested in the three settlements is not compensated for by an increase in the number of trapezes. The number of Montbani blades increases on the other hand.

Both Montbani 12 and Montbani 13 have trapeze-shaped flints with one oblique side retouched and the opposite side truncated. In size and orientation of the oblique retouch they resemble trapezes perfectly, and the type is not documented prior to the introduction of trapezes.²⁵⁰ The type suggests an interpretation of this trapeze with only one side retouched as a rough-out for trapeze microliths (Chapter 8.3.2).

Just like the Tardenoisian, the Sauveterrian is also divided into two phases according to the presence or absence of trapeze microliths. Three sites may be deemed most suitable for study, namely Rouffignac in the Dordogne department, La Baume de Montclus and Châteauneuf-les-Martiques, both in Provence.²⁵¹ Seen from the critical point of view, finds from these settlements are more reliable than those from northern France, for they derive from layers deposited in rock-shelters. They have a considerable number of artefact-producing strata. In between these strata are also deposits of collapsed shelter roofs or matter that was washed down from such. These layers protected the original stratigraphy against secondary disturbance.

In Rouffignac the Sauveterrian phase is represented in six layers, of which only the uppermost contains trapezes.²⁵² In the underlying five layers a gradual change of microliths is observable. Among others, the number of triangle microliths increases. Isosceles forms dominate the lower layers, while in the upper layers the majority are scalene triangles. There are C 14 datings from all layers of this sequence, the lowest level registering 7200 ± 90 b.c. and the uppermost 6420 ± 100 b.c.²⁵³

Addition of broad microliths does not change the mutual proportion of other types of artefacts to any significant degree.²⁵⁴ The number of broad microliths is only 7, or 4% of the total assemblage. Three trapezes are of type 4, while the others are a special sub-type of type 4, called Martinet type with concavely retouched sides. A C 14 reading from the trapeze-producing layer gave 5850 ± 50 b.c.²⁵⁵

Due to the well-protected location of the site, organic material was also preserved. Artefacts such as simple points and chisels, fashioned of red deer bone and antler occur in all Mesolithic layers. Decorated bone artefacts, too, came to light from layers not containing trapezes. One of these displays simple incised lines, another has shaded bands of elongated Z shapes.²⁵⁶

The settlement Gramari in open terrain, located in the Vaucluse department, incorporates several artefact-producing Mesolithic layers.²⁵⁷ The two uppermost Sauveterrian layers lacking trapezes are radiocarbon dated to 6050 ± 190 b.c. and 5790 ± 190 b.c.²⁵⁸

By investigating a number of caves and rock-shelters in southern Provence, Escalon de Fonton was

able to establish a detailed chronology of the Mesolithic and Early Neolithic periods in southern France.²⁵⁹ Two rock-shelters, due to their well-documented stratigraphy, formed the chronological basis. The site La Baume de Montclus lies east of the Rhône valley ca 100 km from the coast, while Châteauneuf-Les-Martigues is located on the coast 50 km west of Marseilles. Out of the total of 32 recorded layers of La Baume de Montclus, layers 22-17 constitute a Sauveterrian phase lacking trapezes. Layer 22, containing a late stage of the phase, was dated to between 6180 ± 240 b.c. and 5800 ± 340 b.c.²⁶⁰ The next two layers, 16 and 15, contain artefacts of a trapeze-producing Sauveterrian. Layer 16 was C 14 dated to 5590 ± 160 b.c.²⁶¹ The trapezes represent types 1, 3 and 4.²⁶² Overlying it are 9 layers with so-called Castelnovian and 2 layers of so-called Cardial.

These two latter cultural stages are also represented in Châteauneuf-les-Martigues with Castelnovian in the four lowest layers and Cardial in the ten overlying strata.²⁶³ The most typical feature of Castelnovian is the trapeze of type Montclus. It can best be described as a type 3 or 4 trapeze whose retouched sides are concave. So far as various stages of Castelnovian may be differentiated, concavity is least pronounced in the earliest stage. A prior stage, called Protocastelnovian, is also documented. Its assemblage consists of Montclus type trapezes in combination with artefacts typical of the regional Early Mesolithic Montadian.²⁶⁴ Montadian is a cultural stage based foremost on flake artefacts where microliths play a very subordinate role.

Cardial may best be described as a Castelnovian which has adopted Neolithic economy practicing both agriculture and animal husbandry. Traditions survive in the flint industry, and innovations are pottery decorated with cardia, polished stone axes and transverse arrowheads. According to vessel shapes and ornamentation, Cardial is divided into three phases.²⁶⁵ The oldest traces of this culture are dated to 5210 ± 55 b.c. in Châteauneuf-les-Martigues, the youngest to 4190 ± 50 b.c.²⁶⁶ In La Baume de Montclus Cardial appears later as Cardial Moyen, dated 4690 ± 55 b.c.²⁶⁷ In coastal settlements of southern France Cardial is documented at about 6000 b.c.²⁶⁸

By correlating the above-mentioned two settlements we obtain a picture of the time span 6000-4000 b.c., with manifest differences between coast and inland. Cultural stages with trapezes are documented from around 5500 b.c. from both regions. On the coast, Castelnovian is a continuous cultural development, while the interior develops a completely new cultural stage. Further developments of typical Castelnovian artefacts, however, seem to run parallel, even though a new economy and pottery - Cardial - are introduced on the coast. The new impulses which on the coast are assimilated by the already existing culture seem to reach the interior first after almost another millennium.

Traces of hut floors are documented both on the coast and in the interior.²⁶⁹ During the period in question they are oval or round in shape, measuring a maximum of 6 m and a minimum of 4 m in length. Settlement in La Baume de Montclus is assumed to have been seasonal and have taken place during the dry summer season, judging by the location.

Castelnovian existed not only in southern France but also on the Iberian peninsula. There only a very few settlements were investigated thoroughly in Portugal. The locality Moita do Sebastiao is a settlement in open terrain which exhibits traces of a rectangular hut construction and graves, and is dated to within the period 5400-5000 b.c.²⁷⁰

17. Central and South Europe

Although there are some very detailed groups of artefact complexes from the central region of the German Federal Republic, so far no absolute chronology has been attempted for these.²⁷¹ The reason for this is that artefacts are found in open, well-drained terrain which consequently has no organic material preserved. Moreover, there are no examples of stratigraphically divided artefact-producing layers.

In regions to the south and north of the Alps, a number of localities with complicated stratigraphic sequences in conjunction with caves or rock-shelters are noted. During the 1960s a number of find sites located close to the course of the Danube in south-west West Germany were investigated.²⁷² Only in one case, namely the investigation of a rock-shelter in Lautereck, was the extensive field research recorded in a precise description.²⁷³ In the lowermost layer of this shelter artefacts from a locally typified Late Mesolithic were found. The finds included lanceolates as the only microlith type, and bone and antler points. C 14 readings corroborate the theory according to which this lowermost layer represents a very late stage of Mesolithic development. The layer is dated to 4490 ± 45 b.c. and this date may be related to readings from the overlying Early Linear Pottery layer dated to 4190 ± 45 b.c.²⁷⁴

In the shelter Mannlefelden I in the Jura mountains trapezes occur in one of the layers.²⁷⁵ This layer was not C 14 dated but the underlying one was, and gave 5910 ± 280 b.c. and 5860 ± 45 b.c.²⁷⁶

Artefact assemblages of a number of other sites investigated by Taute are correlated to that of the Birsmatten-Basisgrotte in Switzerland. This latter locality is divided into five Mesolithic artefact horizons.²⁷⁷ Layers

without trapezes - layers 3-5 - and those producing trapezes - layers 1-2 - are documented. The trapezes are of types 1, 2 and 4. The alterations between trapeze-producing and non-producing layers which are documented are similar to modifications found in northern France. Some researchers therefore assign the finds to the Tardenoisian.²⁷⁸

Only bone, in some cases burnt, was available for C 14 determinations of the Birsmatten-Basisgrotte horizons.²⁷⁹ Readings derived from the same layer resulted in a variation of up to 2000 years so that datings may be regarded as extremely uncertain. Layers 3-5 were dated to 5800-5000 b.c.²⁸⁰

Conditions of preservation of vertebrate remains were favourable. A number of antler and bone artefacts were also excavated. The most important type of such artefacts in the two uppermost layers are broad, double-barbed harpoons with perforated base.²⁸¹ Identical examples in association with antler axes and bone chisels were found at Schötz 7, a settlement in open terrain dated to ca 5000 b.c.²⁸²

Sequences of Mesolithic layers in caves and rock-shelters in northern Italy exhibit artefacts of Sauveterrian nature. Its best representative is the cave Romagnano in the Adige valley in north-eastern Italy.²⁸³ At Vatte di Zambana in the same valley, three layers lacking trapezes were C 14 dated. The lowest layer was dated to around 6000 b.c., the uppermost to ca 5500 b.c.²⁸⁴ One trapeze-producing settlement, Grotta Azurra, was dated by transgression studies to the period 6000-5000 b.c.²⁸⁵ The terminus ante quem of the introduction of trapezes will in this case have to be represented by pottery from the end of the fifth millenium b.c.²⁸⁶

18. Eastern Europe and the Balkan peninsula

Kozłowski distinguished impulses coming from the south, the north and the west to the Carpathian basin. They are represented in the Smolin group of southern Czechoslovakia and have an inventory including Zonhoven points. The group is interpreted as an offshoot of the western European Late Mesolithic.²⁸⁷ The Sered group in western Slovakia is also considered to have an artefact assemblage under northern influence, having isosceles triangles and type 2 trapezes.²⁸⁸ The impetus probably came from the previously mentioned Chojnice-Pienki Culture in Poland.²⁸⁹ A C 14 reading derived from the eponymous settlement Sered indicates the date 4490 ± 300 b.c.²⁹⁰

Finite datings of trapeze-producing layers within south-east Europe exist from the settlement Soroki II near the Dniester in Moldavia, U.S.S.R.²⁹¹ The assemblage is "macrolithic" with few microliths. Type 2 trapezes are represented. Artefacts of organic material such as antler axes were also found. Two C 14 readings gave 5565 ± 120 b.c. and 5470 ± 80 b.c.²⁹² The layers overlying the Mesolithic show similar techniques as well as other kinds of artefacts indicating an economy based on agriculture and animal husbandry.

In eastern and south-eastern Europe settlements in both open terrain and caves as well as rock-shelters exist. The rock-shelter Turcului-Dubova on the Danube in Rumania has a 2.5 m deep deposit horizon which constitutes an important element for understanding the cultural stage lacking broad microliths.²⁹³ The three lowermost layers contain artefacts belonging to the so-called Epitardi-Gravettian stage, which contains elements surviving from the Late Paleolithic of the Apennine and Balkan peninsulas.²⁹⁴ Among the microliths, lanceolates are abundantly represented, while elongated triangles occur only sporadically.²⁹⁵ The uppermost of these layers was dated to 6225 ± 200 b.c.²⁹⁶ There are also bones decorated with zig-zag patterns in the context.

Similar artefact assemblages are also documented along the Danube in Hungary and northern Yugoslavia.²⁹⁷ The next stage of development sets in when broad microliths - type 4 dominating - are introduced. The addition does not affect appreciably the mutual relationship of other artefact types, except that triangle microliths which even thus far were represented by a low percentage, now disappear completely. Characteristic of a later phase are an absolute predominance of trapeze types and the presence of flake scrapers which were well represented during the whole Mesolithic.

South-eastern Europe contains Late Mesolithic settlements which completely lack trapeze types. One of these is Lepenski Vir at the Iron Gate of the Danube.²⁹⁸ This settlement exhibits a cluster of houses arranged in regular patterns as well as graves and remains of a well-developed plastic stone ornamentation. Layers producing artefacts of a hunting-gathering stage were dated to between 5410 ± 100 b.c. and 4610 ± 100 b.c.²⁹⁹ The nearby Vlasac settlement has an artefact assemblage which shows similarities to the Epitardigravettian.³⁰⁰ Srejić places the trapeze-producing Vlasac settlement chronologically between Turcului-Dubova, located about 30 km downstream the Danube and Lepenski Vir.³⁰¹

A sequence consisting of 60 layers was documented in the Franchthi cave on the Peloponnesos in Greece.³⁰² It reflects both Late Paleolithic and Mesolithic as well as Neolithic cultural stages. The Mesolithic layers were dated radiometrically to between 7400 b.c. and 6000 b.c.³⁰³ Type 1 and 4 trapezes in combination with, inter alia, triangle microliths were documented. According to a number of C 14 assays trapezes were introduced ca 7000 b.c. The majority of these were made of obsidian, in contrast to the other artefact types. This observation is highly relevant to the discussion about conceivable external contacts, because the provenience of the obsidian from Milos, an island in the Aegean, can be proved. Since Milos is about 100 km from the mainland, advanced navigation may be presumed.

The pre-ceramic phase of the Neolithic period, lasting a few centuries, exhibits features differentiated radically from those found in the Mesolithic layers. This holds true of both the composition of the osteological material and the artefact production.³⁰⁴ Hunting of red deer and fishing are now replaced by sheep and goat breeding, while obsidian takes the place of flint.³⁰⁵ Microliths disappear completely and are replaced by other, pressure-flaked flint types.

The pre-ceramic Neolithic on the southern Balkan peninsula is not homogeneous, since the locality Argissa-Magula in Thessaly, dated to 5590 $\pm$ 90 b.c. contains trapezes.³⁰⁶

19. Discussion

Looking over the contexts of regions lying outside of what is usually called the central region of the Maglemose Culture, i. e., Denmark and Scania, it spontaneously comes to mind to ask what kind of information the above rendered data may contribute to the study of Ageröd I:B and Ageröd I:D. Or, to be more exact; is there any information in the treatment which could help answering some of the questions that arise when the find material is treated?

The most interesting observations concern the broad microliths. Although it has to be noted that the finds do not give any concrete answer to the questions from where this type of artefact originated and how its use became widespread, they nonetheless offer important hints. The problem of diffusion can be reduced to two alternatives. Broad microliths might either have been created in one place, from where knowledge about this new artefact subsequently spread to extensive regions. Or, morphologically closely related forms might have come into existence in several places and independently of one another, in which case their respective diffusion was more limited.

Broad microliths seem to appear in extensive regions of Western Europe, except Great Britain, during the fifth millennium b.c. (Fig. 94). In areas closest to South Sweden the oldest documented examples are very insecurely dated. From Jutland, for instance, not even a single radiometric dating is available. Not before arriving at the Netherland material do we have the feeling of standing on more solid ground. There, several C 14 datings from the northern part of the country indicate that broad trapezes have been introduced shortly after 6000 b.c. Datings of the latest non-trapeze-producing contexts also lead to this conclusion. The same is valid for the southern part of the country. In France, the oldest trapeze finds come from the south. Here, there are also contexts which contain trapezes as one artefact type among others that have been in use earlier. At the same time there is also material, namely the Castelnavian, which completely lacks narrow microliths. Both assemblages seem to have existed during the period 6000-5500 b.c. Radiometric datings from central Europe are unreliable because of the considerable variation at even one sigma. Trapezes were probably introduced before 5000 b.c., but apparently there were also cultural contexts completely lacking trapezes.

South-eastern Europe reflects a complicated but interesting cultural development. Both trapeze-producing and non-producing settlement contexts seem to have existed synchronously, as well as hunter-gatherer economies contra agrarian and animal breeding societies. The results from the Franchthi cave are decisive, because they prove that trapezes are documented from a time before the economy in south-eastern Europe was converted into a Neolithic economy. Changes occurring in the economic system are believed to have been the results of impulses received from Asia Minor. It follows that the trapeze types could also be interpreted as an example of cultural contacts. The pre-ceramic Neolithic - represented i. a. by the localities Hacilar and Suberde in western Anatolia - are dated to the first half of the sixth millennium.³⁰⁷ Here, types of artefacts made of stone appear that reflect influence whose provenance may be traced to the so-called Natufian Culture in the South Levant.³⁰⁸ Artefacts from e.g. Argissa-Magula, on the other hand, have their best counterparts in contexts of the so-called Palegawra type, which include narrow triangle microliths and trapezes.³⁰⁹ Such artefacts occur in Mesolithic and Early Neolithic settlements in northern Iraq. The best known Neolithic locality is Jarmo.³¹⁰ C 14 readings of samples from the oldest Jarmo have given a considerably longer interval in time than what could be considered reasonable. A dating to ca 6700 b.c. has been used as a point of orientation.³¹¹ The westernmost find locality of Palegawra type artefacts, namely the pre-ceramic Cayönü Tepesi, is located in eastern Anatolia and dated to the period 7000-6500 b.c.³¹²



Fig. 94. C 14 dates of the oldest context having broad microliths in Europe (crosses). Circles mark the youngest dates of context lacking broad microliths.

As mentioned previously, western Anatolia reflects impulses coming from the south. Thus, we are left with a gap in the row of contacts between the trapeze-producing areas of south-eastern Europe and Asia Minor. The question is whether the finds mirror the real prehistoric points and boundary lines of contact. The well-documented diffusion of obsidian from equally well-documented places of origin may possibly help to solve these problems.³¹³ In settlements located within the "fertile crescent" extending from the southern Levant in the west to Iran in the east, obsidian of Anatolian provenance is found. This fact is an extremely important proof of trade having existed. It follows that long-distance exchanges of ideas should be considered a realistic possibility. Perhaps the trapezes from the Franchthi cave which are made of obsidian should be fitted into a frame of wider connections. So far, however, contact routes to eastern Anatolia are not documented, and information about the Mesolithic and the Early Neolithic of extensive areas of Anatolia is extremely scanty.³¹⁴

What we have, then, are some early datings of broad microliths which could possibly be brought in connection with finds from the Balkan peninsula. As for Western Europe, Castelnovian trapezes seem to be the oldest examples. Escalon de Fonton believes to have documented finds of this artefact in a stage preceding this culture, since they occur in the find locality Ponteau, by C 14 readings dated to 7830 ± 200 b.c.³¹⁵ But this dating differs from the rest so markedly that it is reasonable to doubt the chronological homogeneity of this particular locality. Perhaps it is of some interest at this juncture to find that a late development of the so-called Capsian, represented in North Africa and containing broad microliths, has been dated to between 6910 b.c. and 6450 b.c.³¹⁶ Therefore, it is quite likely that trapezes found along the north-western coast of the Mediterranean had been mediated via North Africa.

Kozlowski opines that the diffusion of trapezes in Western Europe is connected with the Castelnovian.³¹⁷ In his opinion this culture passes from a beginning stage at about 6000 b.c. into an "explosive" phase, whose after-effects reach as far to the north as South Scandinavia. His theory does not, however, explain

in what way this development effects eastern Europe. Clark's treatment of trapezes presents similar trains of thought.³¹⁸ Clark regards the diffusion as being possibly a wave of impulses, connected with the earliest "Neolithization" or a period preceding it.³¹⁹ That this was the case in the region of the Mediterranean is most likely. Agriculture and animal husbandry probably spread from the eastern part of the region to its western part, and the introduction of trapezes may very well be an indication of communication routes which shortly thereafter served to mediate the notion of a new economy, both through concepts and goods such as grain and domestic animals.

The fact that trapezes were introduced over extensive regions in a relatively short time makes the assumption of several places of origin appear less likely. Nor is there any positive proof of a preceding stage of this type of flint. Trapeze variants of the narrow microlith type are well-documented, but they could hardly have constituted an intermediary stage of development.³²⁰ The type is far too different. The only similarity that can be noted is the procedure of manufacturing in the so-called micro-burin technique. Another striking feature is the amazingly similar shape of the oldest trapeze types, wherever they appear. This emerges when comparing Montbani 12 and Ageröd I:B (Table LXIX).

Table LXIX. Distribution of broad microliths in Montbani 12 and Ageröd I:B.

	Type 1	Type 2	Type 3	Type 4	Type 5
Montbani 12	6%	3%	6%	75%	10%
Ageröd I:B	4%	2%	2%	73%	19%

Other settlements, too, display not one but several standard types. Likewise it is possible to observe how local types gain in importance more and more in find complexes that are younger according to C 14 determinations, for example in the Kongemose Culture, or the advanced Castelnovian.

It would seem that the distance between the south and the north of Europe was an effective barrier to the spreading of concepts. After all, the distance between Ageröd I:B and Montbani amounts to some 950 km. However, we have examples that parallels between two find materials have been established without thoroughly discussing the problem how knowledge has been communicated from one region to the other. An often cited example is the relation existing between the East Anglian find locality Star Carr and the South Scandinavian settlements of the Maglemose Culture.³²¹ The distance between Star Carr and for instance Klosterlund in Jutland is 650 km. In this case, the similarity of ecological conditions, as well as the existence of contact routes over then not submerged parts of the North Sea could probably have facilitated contacts. On the other hand, such rivers as the Elbe or the Rhine must have impeded progress considerably.

An unavoidable question concerns the fundamental reason why broad microliths could spread seemingly untrammelled in such relatively short time? The answer lies in assessing their function. As mentioned previously, introduction of trapezes brings about a drop in the percentage of narrow microliths, and they even disappear completely in several material cultures. From reading the record of materials it may also be seen that wear traces are very similar on narrow and on broad microliths (Chapter 8.3.2). Therefore, it is quite likely that the broad microlith is essentially a technical improvement of a previous implement, namely the hunting arrow - an improvement inasmuch as the broad trapeze replaced the narrow microliths which, arrayed in pairs, formed arrowhead and barbs.³²² The shape of the bow can equally be an explanation why the narrow microliths were replaced by broad ones. A bow from a settlement at Holmegaard from the Maglemose Culture was calculated to have had a pull of about 60 pounds.³²³ Seen in relation to the present-day competition bows with a pull of 40-44 pounds, the Holmegaard bow was powerful. When an arrow, equipped with a sharp point, is shot at great speed, it must hit vital parts of the animal if it is to be effective immediately. In other parts of the body the damage is less and takes effect much more slowly. But an arrow equipped with an oblique or transverse cutting edge can accomplish more damage in that it e.g. tears apart a muscle. The arrow is also stopped more effectively and stays in the body of the game. That this is so can best be observed when arrows are shot from a short distance. Consequently, the increasing density of the forest might also have been favourable to introducing broad microliths.

A widespread diffusion of broad microliths should have been favoured, if selective principles in hunting were by and large the same in the regions in question. In Rouffignac 3, which has the oldest datings of trapezes in France, the osteological material consists of 47% wild boar, 28% red deer and 8% roe deer.³²⁴ In the Swiss cave Birmatten-Basisgrotte the proportions of the three most common animal species in the trapeze-producing layer 3 are: wild boar 40%, red deer 39% and beaver 5%.³²⁵ Nor does the osteological material reflect any tangible differences in the proportion of game animals between layers with, and layers without, broad microliths that would indicate changes having occurred in the selection of game. In layer 3 of the find locality Gramari in the south of France the most important game animals are red deer, 49%, wild boar, 14%, and aurochs, 12%.³²⁶ A similar calculation of the Mesolithic layer in Lepenski Vir in northern Yugoslavia results in 86% red deer, 5% aurochs and 5% wild boar.³²⁷ The re-

mains of vertebrates in some caves in southern Germany have also been classified, although the finds are published incompletely.³²⁸ In three of these cave contexts containing trapezes, red deer, wild boar and roe deer are predominant.

Although ecological conditions in Europe varied during the transition between the Boreal and the Atlantic periods, this did not bring about any essential regional differences in the selection of hunted game animals.³²⁹ However, it must be noted that several economic factors, such as hunting of small game and birds as well as fishing, have been left out of the account. The settlements recorded here were all located inland and had varying access to watercourses. But if we presuppose that broad microliths were an improvement when hunting e.g. red deer, this would already give an explanation of why the type spread so far and wide in such relatively short time.

We may ask whether there have been any other, similar examples of concepts being communicated. Perhaps the diffusion of the slotted bone point may be seen as such.³³⁰ But in regard to that question, we unfortunately lack documentation from a large region extending from Asia Minor to the Baltic. Finds of slotted bone points from Scandinavia, the northern parts of the U.S.S.R. and Alaska, where the oldest items were found in Siberia, indicate a provenance from the east.³³¹

Another phenomenon, i.e., burial features as they have been practised in South Scandinavia, are regarded by some as a spiritual loan from far-away cultures, but so far no factual grounds have been presented.³³² All that can be demonstrated is that there are several burial features common to all of Europe.³³³

According to Kozłowski there might have been a similar diffusion of the extremely narrow microlith type which characterizes the Sauveterrian during the time span 6700–6500 b.c.³³⁴ This diffusion would have influenced the artefact assemblage in some regions, e.g. Great Britain and North-west Germany.

As is evident from the above presentation of the cultural situation in Europe, not only the documentation of trapezes but also facts concerning influences originating in the South Scandinavian and North European cultural evolution have been considered. The handle-core, which may be regarded as an artefact of Scanian or East Danish provenance, also occurs on the Swedish West coast, while it is sporadically documented on Jutland and in North-west Germany. But it is questionable whether this reflects a fair picture of the actual diffusion process of handle-cores, since the type is well-known within large parts of Scandinavia.³³⁵ When dating find contexts containing handle-cores, the usual procedure was to refer to datings from South Scandinavia.³³⁶ Recently discovered finds from Garselet in Västerbotten may well suggest that a diffusion route other than the previously accepted one, going from south to north, should be considered.³³⁷ Layers in which handle-cores are documented have been C 14 dated to between 6210 ± 110 b.c. and 5930 ± 300 b.c., i.e. to about the same time span as those in South Sweden.³³⁸ A north-southerly diffusion pattern appears plausible if we consider the circumpolar distribution of the handle-core, from the U.S.S.R. to Alaska,³³⁹ in which latter region it is called a core of Campus type. Both in North-east Asia and in Alaska the type is well-known from before 6000 b.c.³⁴⁰

It is equally noteworthy that we can demonstrate that the distribution of flint axes is considerably more limited during the Late Mesolithic than during the Early Mesolithic. This has been documented in South England and in Poland. Thus, artefacts connected with the cultural evolution in South Scandinavia seem to have had a limited diffusion.

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300. J. Kozłowski 1973, p. 324.
301. Letica 1969, p. 9, Srejović 1969.
302. Jacobsen 1969, 1973.
303. Jacobsen 1973, pp. 83 ff., P-1398, P-1517, P-1518, P-1518 A, P-1519 and P-1522.
304. Jacobsen 1973, pp. 59 f.
305. Payne 1975, pp. 120 ff.
306. Milojeć 1962, p. 15, Vogel & Waterbolk 1967, p. 129, Tringham 1968, p. 65, GrN-4145.
307. Mellaart 1970, p. 6, Perkins & Daly 1968, p. 105.
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312. Clark 1969, pp. 97 ff., Cambel & Braidwood 1970, p. 119.
313. Dixon & Cann & Renfrew 1968, Renfrew & Dixon 1976.
314. Bender 1975, pp. 155 ff.
315. Escalon de Fonton 1976 b, pp. 1375 f. MC-591.
316. Camps & Camps Fabrer 1972, p. 33.

- 317. Kozłowski 1976 a, pp. 139 ff.
- 318. Clark 1958, pp. 24 ff.
- 319. Clark 1958, p. 42.
- 320. Kozłowski 1976 b, pp. 43 ff.
- 321. Clark 1954, pp. 180 ff., Althin 1954 b, p. 163, Welinder 1971 c, pp. 153 ff.
- 322. Larsson 1973, pp. 373 f.
- 323. Johansson 1971, p. 24.
- 324. Barriere 1965, p. 11.
- 325. Schmid 1963, p. 94.
- 326. Poulin 1971, p. 124.
- 327. Bökönyi 1972, p. 187.
- 328. Jochim 1976, pp. 145 ff.
- 329. Jarman 1972, pp. 126 ff.
- 330. Clarke 1976, pp. 453 f.
- 331. Indreko 1948, pp. 282 ff., Okladnikov 1961, Fig 4, 1962, p. 273, 1964, p. 139, Medvednev 1964, Fig. 4:31, Larsen 1968, pp. 54 ff.
- 332. Welinder 1971 a, p. 94.
- 333. Albrethsen & Brinch Petersen 1977, pp. 24 ff.
- 334. Kozłowski 1976 b, p. 51.
- 335. Gräslund 1970, pp. 144 f., Lannerbo 1976, pp. 55 f., Welinder 1977 b, pp. 30 ff.
- 336. Gräslund 1970, p. 144, Welinder 1973 d, p. 45, Lannerbo 1976, p. 70.
- 337. Sundquist 1970, pp. 32 ff., 1978, p. 132.
- 338. St-5190, St-5191 and St-5193.
- 339. Cook 1968, pp. 121 ff., Hayashi 1968, pp. 169 ff., Bandi 1969, pp. 50 ff., Anderson 1970, pp. 65 ff., Powers 1973, pp. 56 ff.
- 340. Bandi 1969, p. 52, Andersen 1970, pp. 62 ff.

VI SOCIO-ECOLOGICAL INTERPRETATION

20. Resource analysis

20.1. The physical environment

If we want to fit the settlements Ageröd I:B and Ageröd I:D into their appropriate economic perspective, a study of the physical environment is of primary importance, especially in respect to factors determining the choice of locality to be settled, the number of settlers and the resources exploited.

Several investigations dealing with settlements, starting from soil distribution, topographic conditions and denoted site catchment analyses have been presented.¹ When applying this method, the first step to be taken is to try to delimit the range which could be exploited from a given settlement. In regions inhabited by hunter-gatherer societies, a surface area with a radius of 10 km from the settlement is regarded as a realistic operational model.² A person can walk this distance in two hours, which is determined as the optimal performance that can be accomplished in one day from a camp and back. It has to be noted, though, that this performance applies to Bushmen in an environment which is radically different from the one described here, having sparse vegetation only and no topographic features impeding normal progress.³ In a forested area with many natural obstacles such as open water surfaces, watercourses and hilly terrain, walking speed and thereby also the size of the land accessible from the settlement naturally decreases. On the other hand, watercourses may be used as transportation routes. The area which the members of a group inhabiting a settlement would be able to penetrate would probably not be shaped like a circle with the settlement as a hub, but rather quite irregularly, depending on how easy or difficult the terrain is to cover in various directions.

In the present case, geological maps were used as a basis of resource analysis.⁴ Although they are quite old, they are a better illustration of the relation of waterlogged to solid ground than present-day maps, since they were drawn at a time when drainage had not yet been completed. Soil determinations of the old maps were also accepted, and accordingly, the area contains six types of soil (Fig. 95). Even a cursory glance clearly detects a division into two different sections divided by the river Rönne å, due to the explicit difference in composition of the two kinds of morain. The more clayey and calcareous slate and bedrock morain forms the south-western part while the bouldery bedrock morain, owing to the nature of the underlying bedrock, is found in the north-eastern part. The area, which borders on Ageröd I, has been bipartitioned into segments A and B for the purposes of an intended detailed analysis which will be presented below. The boundary line not only follows the course of the river Rönne, but at the same time divides both the bog complex Ageröd-Rönneholm and the present-day Ringsjö lake. Thus, both segments of the circle should have been equally accessible to exploitation.

The distribution of soils and water surfaces within the circle segments both in regard to a 5 km - area I - and to a 10 km radius - area II - are illustrated in Table LXX. Recording the area with a radius of 5 km serves the twofold purpose of illustrating the nature of the immediate terrain surrounding the settlement and of facilitating a calculation of the degree of exploitation of resources, since this terrain was most likely exploited more intensively than areas lying further away.

In both circle segments, land occupies by far more space than water, but the distribution of vegetationally rich, respectively poor, sediments is different. Sandy deposits are more extensive in segment A, while terminal morain predominates in segment B. This is true of both area I and area II. To be noted is the difference in percentage of water-logged ground in the two sectors. In area I no less than 19% consists of bog and marsh as compared to only 10% within area II. Moreover, the morain rich in clay which is more nutritious expands over a larger surface in the former area.

In order to obtain a representative picture of the landscape as it was during the period in question, it has to be noted that certain alterations have taken place. Here, only the proportion of open water surfaces and organogen deposits are touched upon. Apart from the overgrowth process, no history of other precise data is available for the Ageröd-Rönneholm bog complex. The northernmost point of the equally investigated bog Lyby Mosse barely touches the periphery of the former complex.⁵

Welinder made a metric arrangement of Nilsson's results concerning Scanian bogs and arrived at some conclusions about tendencies noticeable in the overgrowth process.⁶ The majority of bogs - formerly lakes - are already fully developed carrs during BO 2 or AT 1. It is to be noted that the surface of the investigated bogs, i. e., Ageröds Mosse and Rönneholm Mosse together, is considerably larger than that of all the other waterlogged areas within the analyzed area. Most of the other areas are less than 1 km² and were probably in an advanced stage of overgrowth at the transition BO 2/AT 1. Welinder's maps were used

Table LXX. Distribution of soils and water of the area round Ageröd I.

	Area I (with a radius of 5 km from the settlement)						Area II (with a radius of 10 km from the settlement)					
	Segment A		Segment B		Σ		Segment A		Segment B		Σ	
	km ²	%	km ²	%	km ²	%	km ²	%	km ²	%	km ²	%
Waterlogged ground	6.3	16.0	8.5	21.5	14.8	18.8	11.5	7.3	19.2	12.2	30.7	9.8
Terminal morain	0.4	0.9	1.6	4.1	2.0	2.5	1.1	0.7	9.8	6.2	10.9	3.5
Sand	1.6	4.1	0.6	1.6	2.2	2.8	3.4	2.1	0.6	0.4	4.0	1.3
River sediment	0.4	0.9			0.4	0.5	1.4	0.9	0.6	0.4	2.0	0.6
Open water	2.8	7.2	1.3	3.4	4.1	5.2	9.5	6.1	11.8	7.5	21.3	6.8
Morain, rich in clay	26.9	68.6			26.9	34.3	128.7	82.0	1.7	1.1	130.7	41.5
Morain, poor in clay	0.9	2.2	27.2	69.4	28.1	35.8	1.4	0.9	113.3	72.2	114.7	36.6
Measured values:												
Waterlogged ground	4.5	11.5	5.6	14.2	10.1	12.9	9.0	5.7	15.4	9.8	24.4	7.8
Open water	4.5	11.5	4.2	10.7	8.7	11.1	12.0	7.6	15.6	9.9	27.6	8.8

for illustrating the environment of the Ageröd-Rönneholm complex during the Mesolithic.⁷ In respect to waterlogged grounds of at least 1 km², 50% of their surface was judged to have been filled in. Results of these reasoned calculations may be studied in the lower part of table LXX. The calculation results in doubling the number of bodies of open water in area I, while their number in area II increases by 23%. Calculation of waterlogged areas may seem a trifle in comparison to the total area, but is of superior importance in evaluating resource output.

A complete analysis of the environment around the settlement also includes topography. In area B the highest difference in level amounts to 125 m (Fig. 96). Ageröd I may be said to be located in the central part of a ca 6 km wide basin whose altitude, apart from some minor variations, is 55 m above sea-level. At the time in question the major part of this basin was filled by a lake.

Along the beaches of the present-day Ringsjön a number of both fairly wide and of narrow formations of low terrain are observable. Along the channel of the river Rönne and in the south-western part there are two easily discernible valleys, the latter called Bosarpssänkan.⁸ They open up towards the north and west respectively. These terrains with a relatively even floor would have been easier to cross for the settlers and the watercourses would have provided a means of transportation.

Towards the north-west, the terrain rises fairly gently to begin with, and then turns more and more hilly as it nears the offshoot of the ridge Söderåsen. Also in the south-western part altitude above sea-level increases, but here the terrain rises successively. Thus, it should hardly have been difficult to walk over this ground. The same is valid for the northern sector.

The steepest rise is in the north-east, where boulders and solid rock would have put obstacles in the way of the wanderer. Although there are numerous minor watercourses, they could hardly have served as transportation routes.

20.2. The flora

During the transition period BO 2/AT 1 a striking vegetational succession takes place, transforming the forest - until then dominated by pine and birch - into a mixed oak forest. This is clearly evident when looking at the correlated fig. 88 and at Nilsson's arrangement.⁹ The comparative studies, related by Nilsson, between the Ageröd diagram and analyses made on a drained lake - Bjärsjöholmssjön in southernmost Scania - show certain differences.¹⁰ Compared to the latter, the role of the mixed oak forest in Ageröd is less prominent during both BO 2 and AT 1. During AT 1 the pine birch forest is just as well represented as the mixed oak forest.

A direct connection seems to exist between the increase of mixed oak forest and a rise in the average yearly temperature. The latter can be traced in the increase of certain plant populations preferring warm climate, primarily mistletoe and ivy.¹¹ But other factors, too, influence distribution. The immigration rate of diverse tree varieties and their ability to compete with other varieties are two such factors.¹² It is also very important to what degree the soil quality may have influenced succession.

That vegetation in central Scania has differentiated conditions may be seen from the fact that both oligotrophic and eutrophic bodies of water existed in the investigated area.¹³ The former type is represented

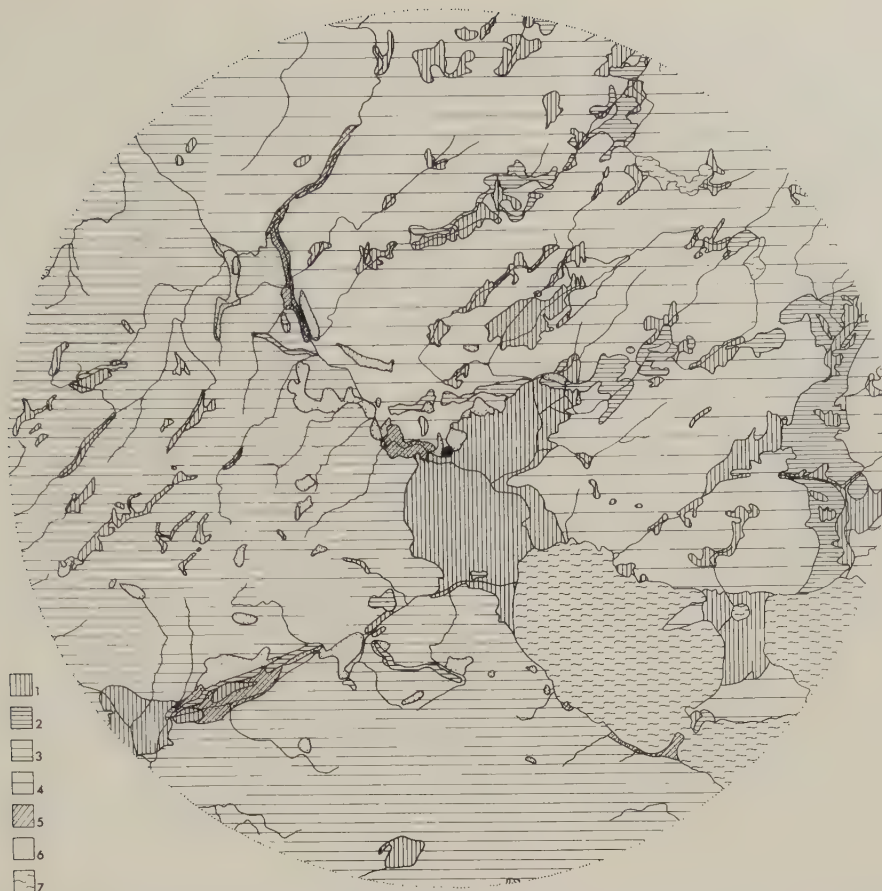


Fig. 95. Distribution of soils and water within a radius of 10 km from Ageröd I. 1: waterlogged ground, 2: terminal morain, 3: morain, rich in clay and poor in boulders, 4: morain, poor in clay and rich in boulders, 5: river sediment, 6: sand and 7: water.



Fig. 96. Topography within a radius of 10 km from Ageröd I.

in the south-west - segment A - the latter in the north-east - segment B. Differences in vegetational composition and probably also in the process of overgrowth are noticeable between these two areas, one incorporating water rich in nutrients, the other housing poor nutrition.¹⁴

During a transitional phase the effect of these components should be particularly perceptible. Pine and birch, labelled as pioneer varieties in the Swedish flora, had contributed tremendously to enrich the soil with mulch and humus, thus promoting the growth of tree varieties needing more nutrients and penetrating the forest later on.¹⁵ Competing against shady trees like elm and linden, pine and birch soon had to withdraw from the nourishing morain south-west of the Ringsjö lake.

On the north-easterly morain, in contrast, they formed a considerable component for a much longer time, as may be seen from the pollen graphs due to their lower demands on the soil.

During the Late Boreal period, elm predominates in the mixed oak forest. Its claim on the soil are high and for this reason its spread on the north-eastern morain should have been limited.¹⁶ At the time of settlement the linden already reached considerable proportions in the deciduous forest. Its claims on the soil are not quite as specific as that of the elm.¹⁷ Since the latter is also the shadiest tree of the mixed oak forest, the linden would hardly have reduced the elm to any significant degree. On somewhat poorer soils, on the other hand, the linden replaced the pine, as did the oak which needs much light. There are two sub-varieties of oak, each having different requirements.¹⁸ Both have probably existed in prehistoric times. The most common present-day oak, *Quercus Robur*, thrives best on relatively moist ground, while *Quercus Petraea* prefers drier acid soils. Thus, it is the latter which would have had a higher capacity to force out pine on e.g. terminal morains.

Setting out from the above pre-conditions the following reconstruction of the forest can be proposed (Fig. 97). In the area to the south-west and south of the Ringsjö lake, elm, linden and hazel populations were prominent, probably even predominant. Since the two former varieties are shade trees, undergrowth was sparse. Lower vegetation was mainly spread close to watercourses or bodies of open water and infilling lakes. On these same grounds alder and oak formed the main components of deciduous forest. On the few existing terminal morains and sandy areas the pine element was still vigorous but was successively replaced by oak.

In the northern and north-eastern part of the investigated area the forest was composed of hardier trees such as pine, birch and oak, which also need more light. This in turn allowed a more luxuriant undergrowth. In drier tracts, i.e. on the many terminal morains, heaths with thinly spread pine woods would have been present. The large number of lakes, waterlogged areas and watercourses also contributed to giving the landscape a more open and free character and, at the same time, a heterogeneous forest.

A calculation of the optimal population density must be evaluated in consideration of its intrinsic sources of error. One of the numerous questions concerning this issue is how far the remains of consumed meals are representative of the total consumption. The excavated remains of animal food are so numerous that a calculation, even though it may be weakened by several inaccuracy elements, appears feasible. Traces of vegetational foodstuffs are documented in Ageröd I:D, but uncertain in Ageröd I:B. Trying to evaluate the importance of plant food in relation to that of animal food merely on the basis of these finds would be far too uncertain. In a summer camp, which this settlement site quite likely was, plant foodstuffs may have provided an essential part of nourishment. A number of plants composing the beach vegetation were usable for food, among them reed and buckbean, the pollen of which are documented during the period in question.¹⁹ The seeds of several plants may have been gathered, as documented by a find of a collection of seeds of the yellow water-lily at one of the Holmegaard sites.²⁰

After consulting sources of information concerning hunter-gatherers from all over the world, Lee made a study on the relationship between hunting, fishing and gathering.²¹ The study shows that the percentage of each of the three groups quite naturally depends on where a settlement is located, but also, generally speaking, that vegetables have great importance everywhere. In regions ecologically somewhat similar to Ageröd, for instance in certain areas of North America, the plant food constituted 20-40% of the caloric intake.

20.3. The fauna

The importance of fishing is highly varied among hunter-gatherers depending entirely on the proximity of bodies of open water. That fishing was practiced in both Ageröd I:B and Ageröd I:D, is unquestionably demonstrated - in the former by vertebrate remains, in the latter by the find of a fishhook of such size that only fish as large as pike or perch would have bitten (Appendix III and fig. 82).²² Apart from the documented fish, i.e., pike and tench, probably even perch, eel, roach, sheat-fish and carp were caught.²³ The locality itself is extremely suitable for fishing. The site was probably chosen not only because it was

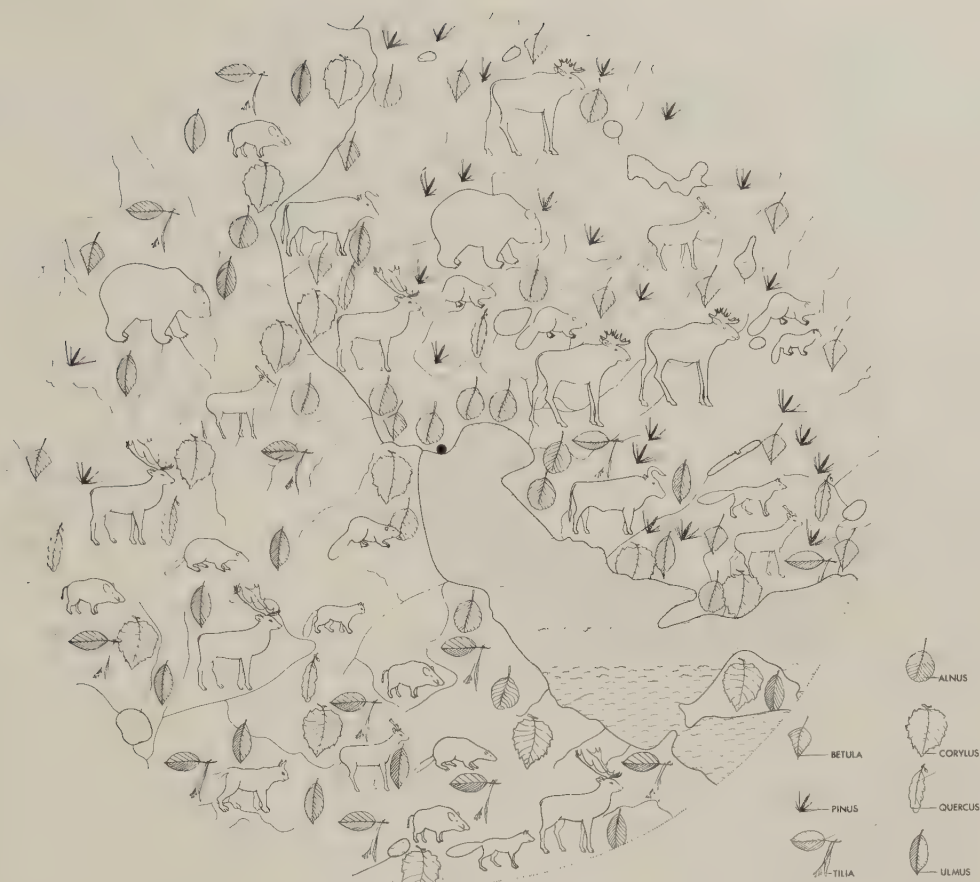


Fig. 97. Hypothetical distribution of flora and fauna at the transition from the Late Boreal to the Early Atlantic period.

on the beach and close to the still open water surfaces of the basin, but also because it was close to the only real outlet of the lake which provided faster flowing water richer in oxygen than other parts of the lake complex. In addition the vicinity of the outlet should have been free of ice for a longer period of the year. Nor should the possibility be excluded that the river was exploited by means of bow-nets and other stationary fishing devices. In view of these favourable indications this food resource may have played an important role, fully compatible with plant gathering.

How important bird hunting was is just as difficult to evaluate. The white-tailed eagle is the only species determined, but it was probably hunted more for its feathers' sake than for food (Appendix III).²⁴ At the time of settlement the environment was a biotope suitable for several kinds of birds, primarily swimmers and wading birds. Species recorded at Ageröd I:HC and caught in an environment which is not much different from that of Sections B and D, give us some pointers.²⁵ Moorhen, shoveller, redbreasted merganser, pintail, widgeon, bean goose, swan, red-necked grabe, hen harrier and great crested grebe are all birds housed in the reed belt or in its immediate vicinity, while the capercaillie nests in the forest. Gathering bird's eggs may also have provided food, although only for a short period of the year.

Lepiksaar points out in his osteological report that high fragmentation of the material and its causes pose problems (Appendix III). In order to get a workable basis for evaluating the role of various mammals, primarily ungulates, we need some kind of calculable percentage. Therefore, the calculation is based on the number of fragments for each species, taking into account that several uncertainty factors may exist.²⁶

The percentages representative of the five most common species are recorded in table LXXI. For comparison, there is also a column for finds from Trench D 1 combined with those from Section B. Only the figures for aurochs show any considerable difference. Percentage figures for each species as calculated on the basis of find frequency can only denote the relative number of individuals brought back to the camp. In order to get a fairer picture of the real situation another coefficient, namely butchering weight must also be taken into account.²⁷ Butchering weight has been calculated as follows: aurochs 500 kg, elk 175 kg, red deer 150 kg, roe deer 15 kg and wild boar 75 kg. Results are recorded in table LXXI.²⁸ In Section B the red deer stands for almost one half of the total meat consumption, and in Section D for

Table LXXI. The importance of the five most common species according to find units and butchering weight.

	Find units				Butchering weight			
	Ageröd I:B		Ageröd I:D		Ageröd I:B		Ageröd I:D	
	with D1 number	%	without D1 number	%	number	%	without D1 %	%
Aurochs	23	7.6	7	3.6	3	3.2	14.8	10.7
Elk	28	9.3	21	10.8	4	4.3	15.6	5.0
Red deer	125	41.4	76	39.2	72	76.6	48.3	76.7
Roe deer	41	13.6	29	14.9	1	1.1	1.8	0.1
Wild boar	85	28.1	61	31.4	14	14.9	19.4	7.5
Σ	302	100.0	194	99.8	94	100.1	99.9	100.0

more than three-quarters of the total meat consumption. Aurochs and elk gain in importance, while wild pig and particularly roe deer diminish. If we presuppose that fishing, gathering and bird hunting together represent one half of the food consumed, the red deer alone would stand for one fourth of the total calorie intake in Section B, and more than one third in Section D.

When attempting to reach an understanding of on what terms human life was possible, a knowledge of the behaviour of game animals is of utmost importance. The red deer has a certain preference for deciduous vegetation.²⁹ It shuns open plains and prefers areas covered by shrubs and low-growing woods. The red deer has several properties that make it easier to stalk than other deer. It is considered the most sociable of all North European deer. Mature stags live in smallish herds - with the exception of the autumnal rut - while young animals and hinds form larger herds led by a hind of respectable age.³⁰ The herd usually remains within a certain limited area and follows its own particular, well-trodden paths to reach watering places, pastures and resting places. Young harts and old, expelled stags may wander far and wide. That the animals kept to permanent paths and the fact that stags and hinds respectively lived apart during most of the year would have made stalking particularly easy and this may have been the reason for selective hunting.

The osteological analysis of faunal remains from Ageröd I:B and Ageröd I:D does not reflect any special preference for sex or age. In contrast, some of the continental settlement find complexes seem to reflect a distribution which is not equivalent to the natural composition of red deer population.³¹ Although the calculations are made on the basis of a relatively small amount of finds, young stags and old hinds appear to be present in a larger number than what is representative in nature. These are also the two categories which, taken from the economical point of view, are the least productive members of the herd. By decimating them, optimal productivity may be achieved.

The stationary way of living might also mean that herds living near a settlement were under observation, and that the settlers had exact information on possible movement to another place. One indication justifying this assumption is the considerable amount of shed antler among raw materials for artefacts. All antler axes and adzes exhibiting preserved parts of the beam close to the burr were manufactured of shed antler. In both Ageröd I:B and Ageröd I:HC, proximal parts of shed antler are also documented. Antlers are shed in the spring from March to May. They are desirable food for small rodents and thus will be broken down within a week or two. It is therefore unusual to find preserved shed antler without knowing exactly where the deer habitate during the time in question. That they are present at the Ageröd settlements indicates a conscious looking for and gathering of shed antler for use during the rest of the warm season, when the growing and still soft red deer antler was less suitable for working.

Other measures than selective hunt have also been discussed. Optimal breeding may also be achieved by transforming or adapting the vegetation so that it would offer the species a maximal output of sustenance. Mesolithic man knew of only one method, namely deforestation by fire.³² Emperical research demonstrated that alterations occurring in wooded areas after a forest fire resulted in an improvement of the red deer population during the first years in respect to both quantity and quality.³³ But in order to keep the positive changes in existence, deforestation had to be repeated at intervals of 10-25 years, for otherwise the tall forest would grow up again. In an area covered by pine woods in New Jersey which was reduced by a forest fire, the white-tailed deer community was calculated to have increased from 2.1 individuals to 14.5 individuals per km².³⁴ To start a forest fire is a measure which, when undertaken at the right time, can be done without a great number of people participating in the work.

In several descriptions of strata accompanying pollen-diagrams from the north-western part of Ageröds Mosse, horizons are evidenced which contain abundant admixtures of charcoal, although they have no connection with culture layers. They may of course indicate a still unknown settlement site nearby but may just as well constitute traces of forest fires, self-started or artificial. We should not forget that

Mesolithic man could have had a remarkable insight for learning from and putting to use his experience after observing what results self-started forest fires brought about.

The ratio of aurochs is relatively small among the identified bones. Considering the fact that a normal mature individual equals at least 500 kg butchering weight, its value as game becomes immediately clear. The biotope of aurochs may be assumed to have been meadows sloping down to bodies of water of considerable proportions and having properties favourable to short or long grasses.³⁵ Its food hardly included leaves or tender twigs and thus it could not have survived in dense forest. Presumably the aurochs lived in herds of about 10 individuals. We may also assume that the aurochs, by its grazing, has influenced the meadow vegetation and even prevented shrubbery from moving in. Two to three individual herds would seem an adequate number in consideration of the size of the prehistoric Ringsjö lake.

The elk prefers waterlogged soils and seeks its food from softwood leaves, completing its diet with herbs and aquatic plants.³⁶ While the open waters in central Scania were filling in, elk, at least for a time, should have thrived there. Elk are seldom stationary but usually roam over extensive areas. Male animals do not have harems and thus are not territory-bound. Therefore, stalking elk should have taken a longer time and more planning, seen in relation to its value as a meat producer, than e.g. that of red deer. Both elk and red deer bone, chiefly bones of extremities, were important raw materials for various artefacts.³⁷

The roe deer prefer wooded areas where shrubbery and vines thrive. Their nourishment consists mainly of leaves and twigs, and chalky soils are their preferred habitat.³⁸ The consequence of this very specialized selection of food is a sometimes extremely fluctuating population depending on how severe the winter is and how long it lasts. If we go by the number of bone remains, roe deer must have been of minor importance in Ageröd I:B and Ageröd I:D. The butchering weight per individual is light, and the antler is of no practical use. However, there are examples of minor bone implements, preferably plain bone points, made of bones of extremities of roe deer.³⁹

Apart from cervides, the wild boar seems to have been the most coveted prey. This species prefers a habitat which offers protective vegetation growing on soil rich in humus.⁴⁰ The herds usually consist of some ten individuals. Of the five most commonly hunted species, the wild boar gives the most weight in meat in relation to its total weight.⁴¹ Nor should its importance as a fat producer be underestimated. Its bones, on the other hand, were seldom used as raw material for artefacts. Wild boar tusks have been used, and the traces of working indicate a function as slashing knives or scrapers.⁴²

Among the other identified species, the beaver thrives in watercourses where aspen, willow and birch grow. The beaver lives mostly in families but may also form larger groups.⁴³ Its pelage is valuable and so is the amount of meat it produces, 5–15 kg.

Other animals hunted for their fur are the wild cat, marten and fox. The habitat of the wild cat is dense forest and undergrowth while the marten lives mostly in dense pine woods.⁴⁴ The fox does not keep strictly to any particular environment.

Although the butchering weight of bear may amount to 50–150 kg, it was probably hunted mainly for its fur. Its habitat is the deep forest.⁴⁵

The coarse pelage of the badger is less valuable. Its living weight amounts to 10–16 kg. It is ideal as prey, since it prefers to stay in the same habitat.⁴⁶

These biotopes of game animals and the previously described composition of the forest allow a correlation of flora and fauna. The chronological perspective has also to be taken into account. With its help it can be demonstrated which game originally living in the pine and birch forest of the Boreal period was able to acclimatize itself to the Atlantic climax forest.

Among the ungulates, the wild boar adapts best to a mixed oak forest which offers it both protection and nourishment. Aurochs and elk have low tolerance to dense forest and sparse undergrowth. Thus, their number decreases markedly during the Atlantic period and they become extinct on the Danish islands.⁴⁷ The roe deer and red deer both thrive in environments which may have forests of quite varied composition and they therefore constitute important elements during both the Late Boreal and the Atlantic periods. Due to the decreasing populations of aurochs and elk, competition decreases partly too.

Generally speaking the south-western segment should be an apt biotope for the wild boar, while the north-eastern part housed elk and aurochs (Fig. 97). Roe deer and red deer were represented in both sectors, though mainly in the south-west.

Another factor which might have favoured several ungulates is overgrowth, with shrubs and low-growing woods expanding in its tow, during a short period. At this juncture the smallish areas of waterlogged ground, sandy soil and terminal moraine are of great importance. The border zone between two different kinds of flora usually has a higher biomass than the grounds surrounding it.⁴⁸ This was primarily noticeable in the north-east. Access to partly different ecological niches might well have resulted in the largest ungulate population that has ever occurred in prehistoric times. Of the other species around the Ringsjö lake, the wild cat and badger probably lived in the deciduous wood, the marten preferring coniferous woods. The beaver would have been more frequent in the north-east sector which had numerous lakes

and rivers.

Summarizing these facts, a hunting trip south and south-west of Ageröd I would have given occasion to kill red deer, roe deer, wild boar, badger and wild cat, while the hunter looking for elk, aurochs, bear and marten should have found his prey in the north-east. The borderline between the two segments A and B consisted of wide expanses of open water and a river, Rönne å, which during Mesolithic times was wider and carried more water. These features must have formed a natural barrier that was difficult to negotiate, and it is quite likely that this accentuated the already existing difference in fauna between the two segments. The fact that such different environments could both be exploited may well have been an essential reason for selecting this tract for settling.

20.4. Raw material resources

The most commonly occurring raw material of finds - flint - is represented in two types, both of Cretaceous age.⁴⁹ The definitely predominant type is massed densely and has few inclusions of fossils. When not patinated, its colour is dark-blue or black. This type of flint is usually called Limhamnsflint or chalk flint.

The other type is coarse grained with numerous inclusions of softer material. Its colour is greyish-brown. Transition between the flint and the calcareous crust is mostly diffuse. In contrast to the Limhamnsflint the working face of the latter, called Kristianstadsflint or speckled flint, is uneven. This type of flint occurs in the morain around Ageröd I, although sparingly and in small pieces only. It constitutes only less than 1% of worked flint. Nor is any tool of this type of flint documented. Limhamnsflint was preferred, quite likely because of its better properties for working. The absence of incorporated impurities made splitting the flint considerably easier. However, this type of flint is not found in the vicinity. Originally incorporated in chalk within south-western Scania, it was broken up by the Baltic Ice recession and is found today within the south-west morain.⁵⁰ It diminishes gradually toward the north and disappears completely at the latitude of between Billesholm and Kulla Gunnarstorp.⁵¹

The point at which the morain is closest to the Ringsjö tract lies immediately north of Eslöv, from where the distance to Ageröd I as the crow flies is 12 km. This type of flint also occurs in the north-easternmost outcroppings of the south-west morain in varying sizes, the largest rocks weighing some 10-20 kg. Patinated and non-patinated flints are both documented. Thickness of the calcareous crust varies greatly according to weathering or rolling by water. Each of the variants in regard to size, colour and quality of the crust existing in Ageröd is represented.

One single example of so-called rolled-pebble flint was found. It is from the Tertiary period, brought up by the ice from layers within the southern Baltic.⁵² This type of flint occurs occasionally in the eastern part of the south-west morain.⁵³

Thus, almost all flint used in Sections B and D had been transported to the site, probably in large pieces such as e.g. cores. It is unlikely that flint could have been gathered from the surface of the ground during the settlement period, but erosion of the shores of watercourses should, on the other hand, have uncovered flint nodules. The question is, whether flint nodules were subjected to some working prior to being transported a distance amounting to at least 12 km. It could well be that such parts of the flint which could not be used were removed at the find site in order to reduce the weight. Cores are regarded as a suitable object for a study of this aspect.

In studying the calcareous crust, cores were divided into two groups according to whether the calcareous crust covered more than 2 cm² or less of the surface. The group of cores with a preserved calcareous crust larger than 2 cm² numbers 280 pieces, or 51% of the total number of cores, and amounts to a weight of 14,925 g, giving the mean weight of 53 g. This may be related to the second group where the calcareous crust covers less than 2 cm², numbering slightly fewer than the first group, namely 274 pieces or 49% of the total number of cores. The total weight of this group is 5,490 g with a mean of 20 g. This kind of division may also be applied, with minor adjustments, to both blade and flake cores. The pronounced difference in weight between the two groups can hardly be interpreted in any other sense than that the cores were not primarily worked over for removing the calcareous crust. Rather, the calcareous crust was stricken away by intensive knapping of a core. Calculations also give the impression that cores had not been quite fully utilized before they were discarded. It is also possible that the calcareous crust was intentionally carried to the settlement, where its chalk could have been used for colouring. Thus, on a minor number of flints it was demonstrated that the calcareous crust had been scraped off, and in the refuse area a lump of a white substance consisting probably of chalk was found (Chapter 8.14).

For other raw materials of minerogen nature that have been used no definite diffusion area can be demonstrated. Those grindstones that were found had probably been brought to the site from one particular area located a couple of kilometres north of Ageröd, where sandstone forms outcroppings.⁵⁴ Raw materials used for stone axes, i.e., diabase, amphibolite and slate, are found in the morain not far from the settlement sites.

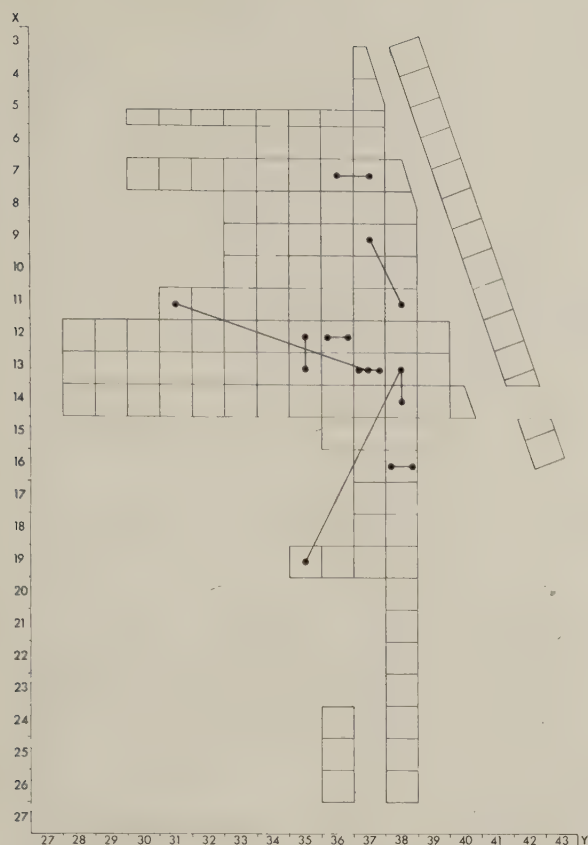


Fig. 98. Ageröd I:D. Distribution of blade fragments which it was possible to fit together.

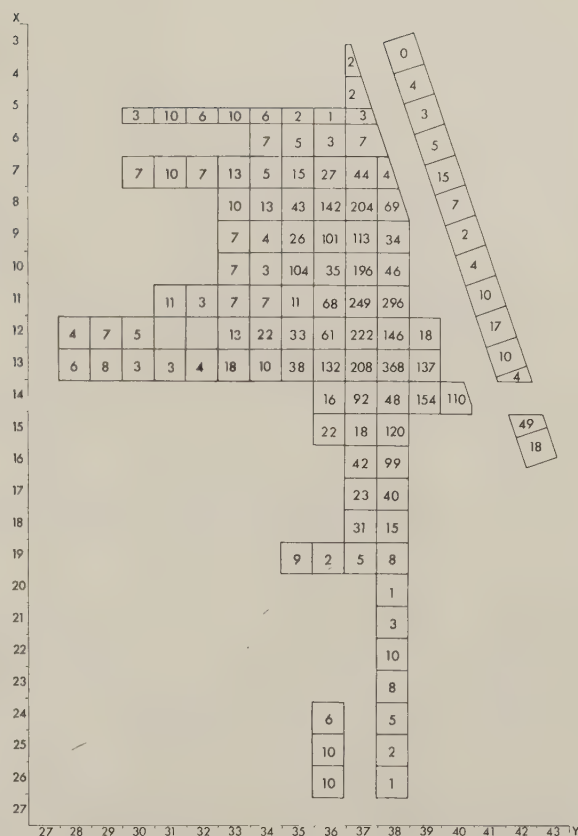


Fig. 99. Ageröd I:D Distribution of bulbar flakes, flakes and blades

21. Analysis of the societal structure

21.1 Artefact distrubiton

The distribution of both waste products and tools within an artefact-producing layer is considered to hold information essential for forming a point of view concerning problems of, i.a., societal structure and chronological homogeneity.⁵⁵

Apart from information obtained from how the artefacts were distributed, distribution of separate parts of one and the same artefact can also indicate the nature and intensity of activities carried out within a given site settlement.⁵⁶ The method is primarily applicable to minor settlement contexts where a complete overview is realizable.⁵⁷ In large find complexes such as Ageröd I:B this piecing together is more difficult, and thus work must mainly concentrate on particularly characteristic artefact types.

21.1.1. Ageröd I:D

In Section D, the fragmentary blades were selected as a suitable basic material for a study of distribution. Examples with preserved calcareous crust and thus ocularly observable were easiest to fit together. Such blades could be put together in nine cases (Fig. 98). In three out of these the respective fragments lay in the same square and obviously were blades that had been trodden upon and broken but whose original position had not been disturbed extensively. The same explanation may be applied to another three cases where fragments belonging together were found in two connecting squares. The remaining three blades deserve more interest in that they were found at distances of 2.5 to 7 metres from one another. The parts of one of these blades were all within the occupational area, those of the other two on the borderline between occupational and refuse area. How far the fragment found in the western refuse area is significant for an interpretation of stratigraphy has been touched upon previously (Chapter 7.3.1).

The flint distribution is shown in fig. 99. Maximum density exists in the south-eastern part of the contiguous investigation area. The maximal number of flints, although most of them quite small, was found in metre square x=13, y=38. In one contiguous area measuring 17 m² density is at least 100 flints per square metre. Towards the north and west density diminishes abruptly (Fig. 100). The largest difference between

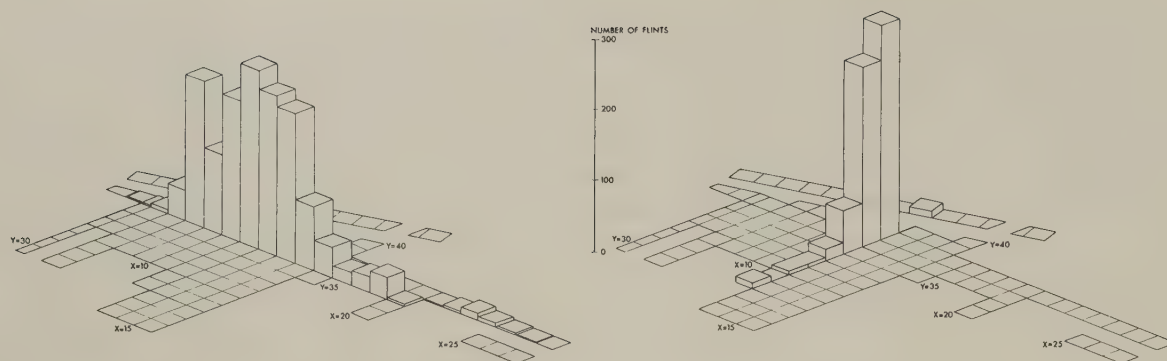


Fig. 100. Ageröd I:D. Flint distribution illustrated in the two cross-sections $x=3-19$, $y=37$ plus, $x=20-26$, $y=38$ and $x=11$, $y=31-42$.

two adjoining squares consists of 104 flints in one square, as opposed to 3 in the other.

Since the area to the east was not totally investigated, distribution in this part is difficult to construe. The low number of flints in the extension of Trench B excavated in 1972 indicates a swiftly diminishing tendency. Towards the south flints diminish successively. To give an example, the decrease from 120 to 1 is here spread along a six-metre-long stretch.

In 1948 the exact position of artefacts was, with a few exceptions, not measured and thus the structure of flint distribution is difficult to appreciate. However, so much may be said that distribution towards the west, north and probably also east indicates some kind of barrier having existed, probably the wall of a hut. Towards the south, proceeding towards the open water, flints were more spread out. It may be presumed that there was an opening in the construction in this direction.

One hearth is documented in the area of investigation (Fig. 26). The metre squares containing it have also the highest ratio of flints damaged by fire (Fig. 101). However, no pronounced boundary line can be demonstrated, as had been the case in the bog Bare Mosse II.⁵⁸ The highest ratio of flints damaged by fire in relation to the number of undamaged flints, 62%, is in the square where the hearth had been found, namely $x=11$, $y=38$. Distribution of flints damaged by fire is by and large consistent with the total flint distribution. This indicates the possible existence of several hearths or a more extensive activity than in Bare Mosse II.

Significant for an objective evaluation of activities carried out at the site are mainly the narrow microliths, forming the largest group of artefacts, and waste products resulting from their production, namely micro-burins. A minor number of narrow microliths were encountered outside the expanse of the culture layer. Distribution of narrow microliths is by and large consistent with the total find distribution (Fig. 102). The largest amount of narrow microliths was found near the hearth, a fact which explains the considerable number of examples damaged by fire. Broad microliths display a distribution pattern with minor differences.

Presuming that microliths demonstrate the total range of activities on the site, knapping floors are indicated by the distribution of micro-burins (Fig. 102). As may be seen, this distribution is considerably more limited than that of the microliths, nor is it quite consistent with the latter. Unfortunately not all micro-burins could be taken into the calculation since several examples lack coordination figures. The majority of micro-burins are situated in the area immediately west of the hearth.

Fig. 103 illustrates the distribution of handle-cores and rejuvenation flakes from these. Similarly to narrow microliths, the majority are within the culture layer. Apart from this layer, objects are primarily found in the western part of the investigated area.

The artefact groups recorded in Fig. 104 are all north and north-west of the hearth. No pronounced concentration to one or a couple of particular squares can be registered. As in the previous distribution maps, distribution outside the culture layer is primarily concentrated to the western area investigated.

With the exception of micro-burins, no interpretation of any particular places of manufacture or delimited areas of any particular kind of activity may be realized from the distribution patterns, unlike the theories Welinder believes to be able to prove at Bare Mosse II.⁵⁹ But this does not necessarily mean that Ageröd I:D is a settlement whose artefacts accumulated in the course of several settlement periods. The number of flints here is almost four times as much as that of Bare Mosse II, indicating a higher degree of activity, since Ageröd I:D supposedly constitutes an area measuring only twice as much as Bare Mosse II.

Within settlements of approximately the same size, the number of finds, with certain exceptions, should be in relation to the duration of the settlement period. However, the number of flint artefacts from Sværd-

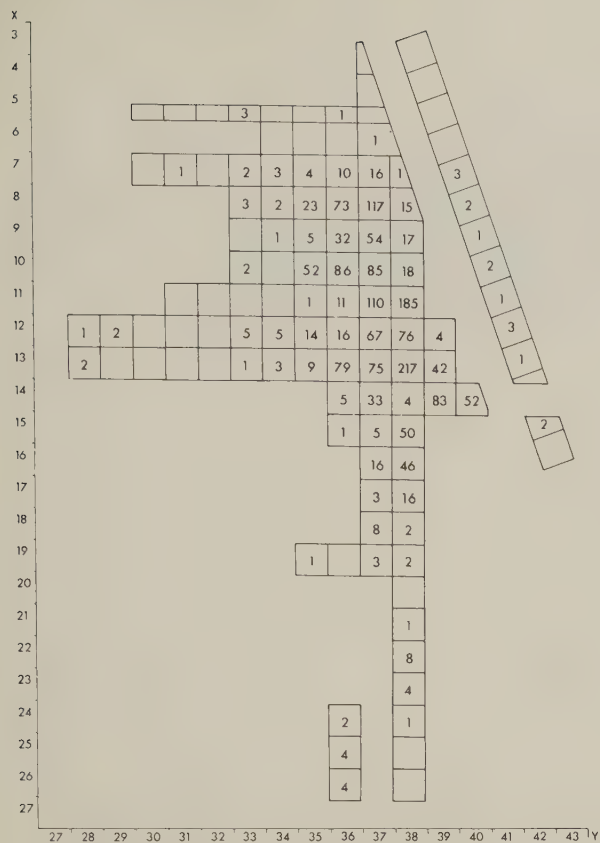


Fig. 101. Ageröd I:D. Distribution of flints damaged by fire.

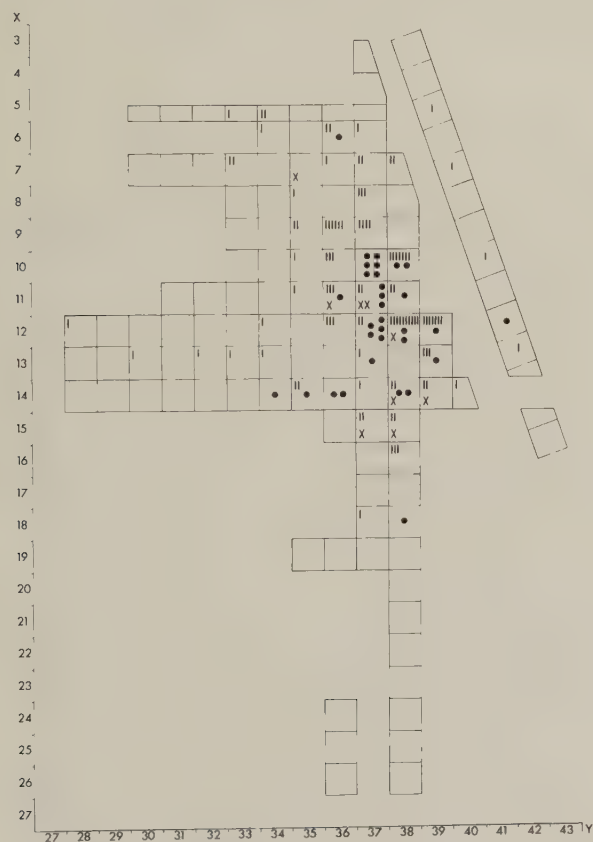


Fig. 102. Ageröd I:D. Distribution of narrow microliths (strokes), broad microliths (crosses) and micro-burins (dots).

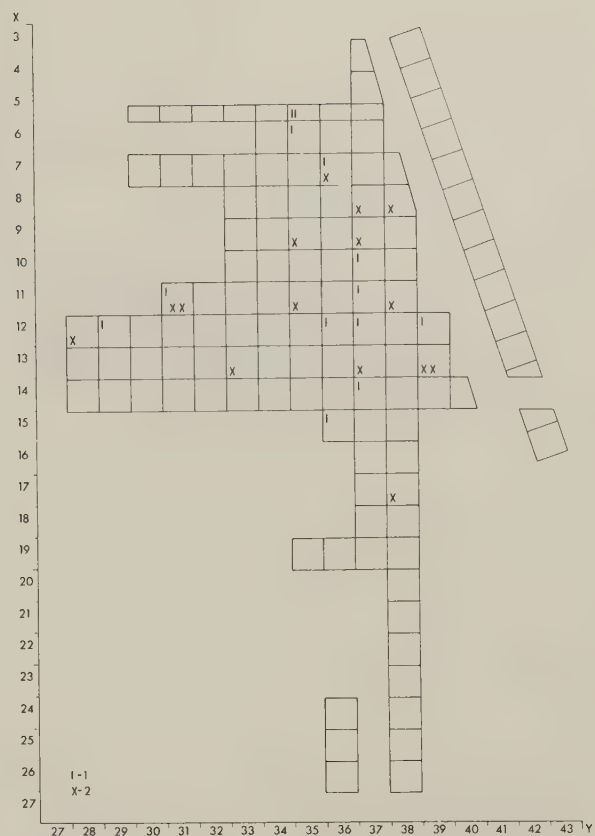


Fig. 103. Ageröd I:D. Distribution of handle-cores (strokes) and core rejuvenation flakes (crosses).

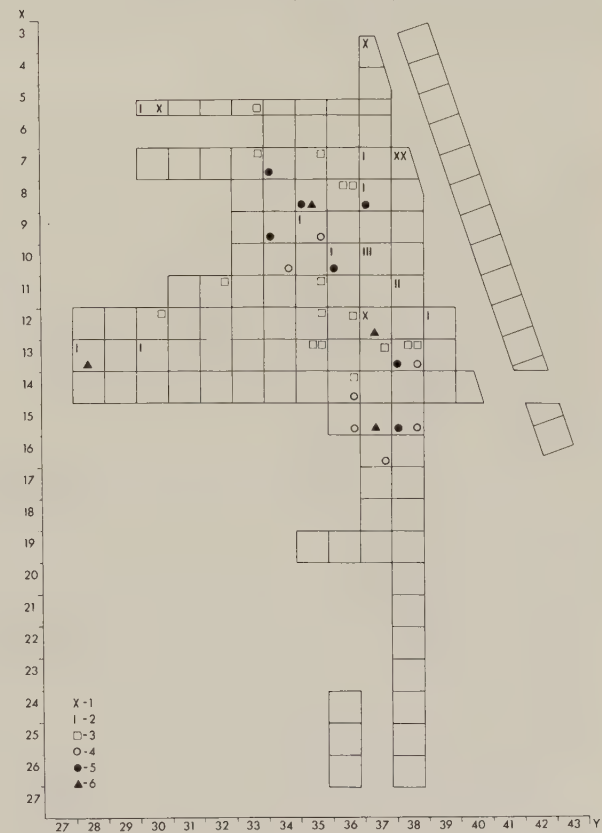


Fig. 104. Ageröd I:D. Distribution of cores (crosses), rejuvenation flakes (strokes), burins (open squares), flake scrapers (open circles), blade scrapers (dots) and blade knives (triangles).

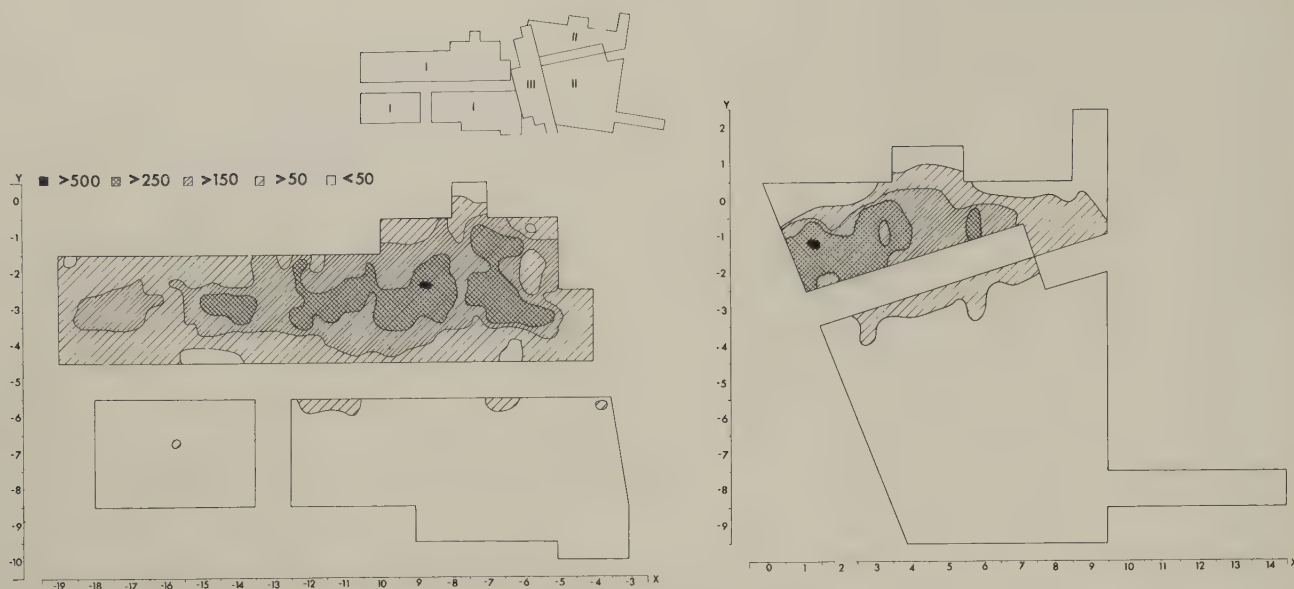


Fig. 105. Ageröd I:B. Distribution of flints in Trench I and Trench II.

borg II, assumed to have been a seasonally inhabited settlement, is 18,706.⁶⁰ There, the sizes of both the occupational and refuse areas are comparable to those of Ageröd I:D.

The considerable difference should indicate not so much a difference in the number of individuals inhabiting the settlement but rather the difference in time they dwelt there. Or it may be due to varying access to flint. Therefore, a comparison of weights should be a more suitable basis for correlation.

Published distribution plans of Sværdborg show similarly to Ageröd I:D no ascertained concentrations of artefact groups but, in contrast, a well-defined limitation of artefacts within the area which is considered as the settlement area.⁶¹

2.1.1.2. Ageröd I:B

The reason for so meticulously investigating this extensive section yielding a large number of artefacts and, as mentioned in a previous chapter, with such time-consuming methods, was to find out whether there were any particular spots indicating manufacture and use respectively (Chapter 4.1).

Fig. 105 illustrates the distribution in layer 2 of the total number of flints within Trenches I and II. The isogram is based on the number of flints per squares of 0.25 m^2 . Even when taking into account some erosion of the highest points of the culture layer, it is obvious that finds are mainly concentrated to a zone measuring about 3 m in width.

The trenches excavated by Althin seem to be located in the border zone between the occupational area and that in which artefacts are spread out, namely the refuse area. Flint density varies greatly even within the occupational area, going from 527 flints to 3 flints per 0.25 m^2 . This square measure unit was chosen in the hope that it would facilitate discerning concentrations which would not show up readily in a system using squares of 1 m^2 .

Generally speaking, flint density of Trench I decreases toward both the west and the east and that of Trench II toward the east. The artefact distribution of the trench between these two, Trench III, investigated by Althin, cannot be incorporated into the distribution maps because it was investigated by a different method. But it is quite clear that find density in Trench III corresponds to that of Trench II on which it borders to the west. Likewise, a diminishing tendency of find density may be demonstrated in that part of Trench III which is nearest to Trench I.

No hearth structure was found. The distribution chart is based on the percentage relation of undamaged flints and such damaged by fire per 0.25 m^2 (Fig. 106). The ratio of flints damaged by fire in Trench I offers no definite information, although the highest percentage is concentrated to a part of the eastern part of the trench. West of it there are fewer squares containing more than 30% of flints damaged by fire. In Trench II there are no squares containing as much as 30% of flints damaged by fire.

What can be seen quite clearly is the difference in the frequency of flints damaged by fire per 0.25 m^2 between Trench I and Trench II. Maximal and minimal figures for Trench I are 33% and 12%, for Trench II, 25% and 8% respectively. This may be explained as follows:

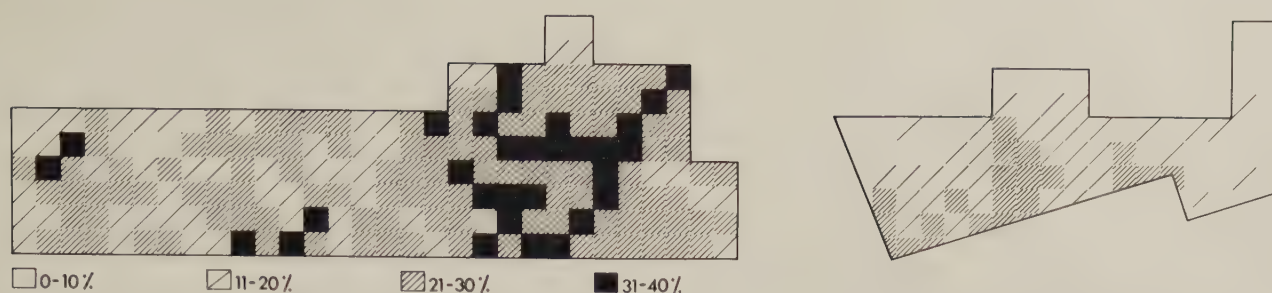


Fig. 106. Ageröd I:B. Ratio of flints damaged by fire per 0.25 m^2 in Trench I (left) and Trench II (right).

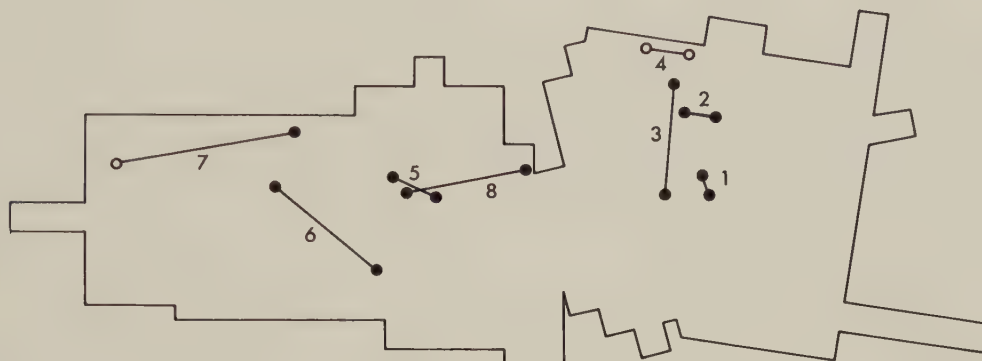


Fig. 107. Ageröd I:B. Distribution of artefacts which could be pieced together. 1: blade fragments, 2: stone axe, 3: grindingstone, 4: blade fragments, 5: broad trapeze, 6: core axe and sharpening flake, 7: blade fragments and 8: blade fragments. A circle illustrates that the piece was found in layer 1 while pieces marked by dots were found in layer 2.

1. Hearths in Trench I may have been larger and thus may have affected a larger number of flints.
2. In Trench I, more hearths may have been established in spots previously used as knapping floors than in Trench II.

Squares with a high ratio are mainly located in areas with high flint frequency, but this offers no real solution to the problem, since flints burst when heated at extremely high temperature.

Only minor efforts have been made to join parts of fragmented blades, so that only four instances could be documented (Fig. 107). A few other artefacts were also joined subsequently. Some of these, the fragmentary broad trapeze and the axe fragment and rejuvenation flakes, have already been mentioned (Chapter 8.3.2, Fig. 41:7 and Chapter 8.10.3, Fig. 60:2). In addition, parts of a stone axe and a grinding stone also were combined (Chapter 8.10.4, Fig. 61:1).

It cannot be said that these combinations contribute further information about concentration trends in Section B. One combination of blade fragments, however, is very important, because it links layers 1 and 2 (Fig. 107:7). At the same time the finds document a conjunction between the occupation area and refuse area of layer 2 (Fig. 107:3 and 6).

The distribution pattern of micro-burins in Trenches I and II is in good agreement with the area marked by the isogram 50 flints per 0.25 m^2 , showing a concentration of flint density as illustrated in fig. 108. Apart from this, it is hardly possible to discern any clear pattern in Trench II except for the concentration in square $x=4, y=-1$, which probably indicates a place of manufacture. In Trench 1, three areas of concentration can be distinguished, namely squares $x=-8 - -10, y=-3$; $x=-14 - -15, y=-3$ and $x=-17, y=-3$.

A division of rejuvenation flakes from products of blade and flake cores respectively was made (Fig. 109). In Trench II the flakes show a tendency to concentrations in two squares, namely $x=1-2, y=-1$ and $x=3.5-4.5, y=0-1$. In the former, the ratio of flakes from blade-cores is 23%, in the latter 50%. In other words, we might here discern spots where blade and flake cores respectively were preferably worked. The distribution in Trench I is considerably more difficult to interpret. One indication of a division into two groups may possibly be discerned with the help of a square containing only few flints, $x=-14 - -15$. No pronounced difference in the distribution of rejuvenation flakes from blade and flake cores respectively can be demonstrated.

The flint density gives an important insight to the study of delimiting the activity areas. The question arises whether any distribution of finished products may also be distinguished within the two flint concen-

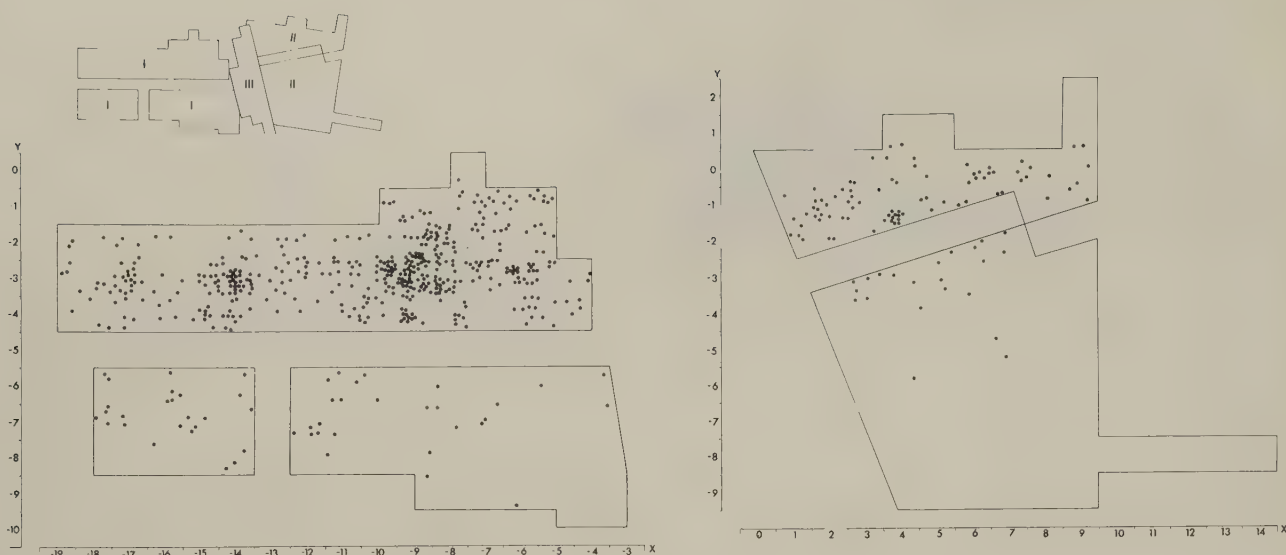


Fig. 108. Ageröd I:B. Distribution of micro-burins in Trench I and Trench II.

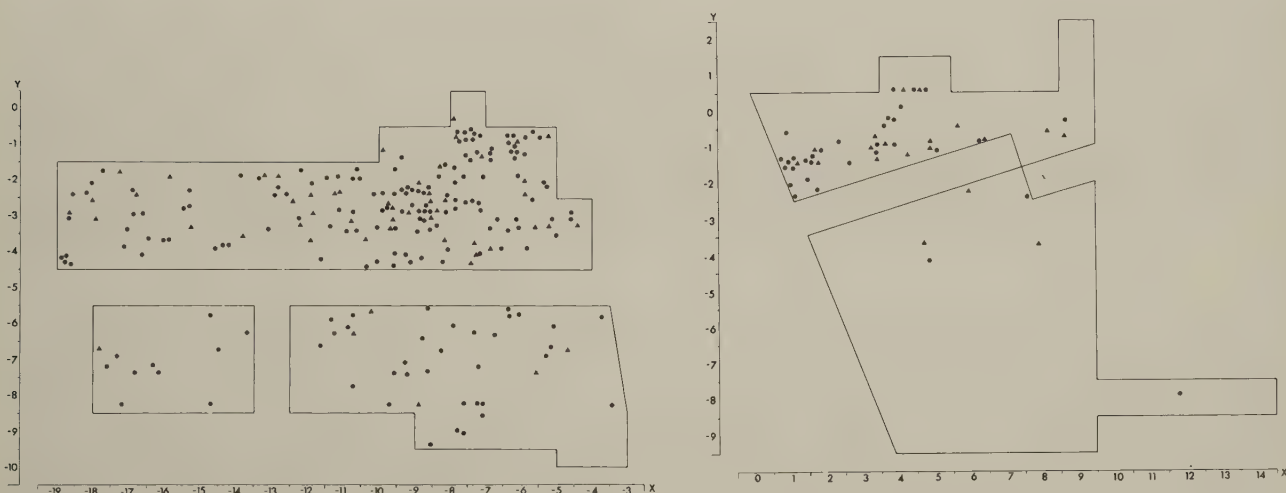


Fig. 109. Ageröd I:B. Distribution of rejuvenation flakes from blade cores types A-B (triangle) and from flake cores type D (dots).

trations. To this end, distribution charts of microliths and flake-scrapers are given (Fig. 110 and 111).

In Trench I, no distinct groupings are present, but an increased density of narrow microliths in squares $x=-9.5 - -10.5$, $y=3$, $x=-13.5 - -14.5$, $y=3$ and the collection interpreted as a depot find, in $x=-14.5$, $y=-8$ exist (Fig. 110).

In Trench II, a twofold division of the narrow microlith distribution can be discerned, showing a belt with only few finds running in along the line $x=3$ in the occupational area. There is also an indication of a third group in $x=6-7$. Notable is the curious presence of narrow microliths in the refuse area within a belt represented by $y=-7 - -8$. Hypothetically, these may have belonged to composite artefacts, e.g. arrows, that had been discarded, an alternative which has been advanced previously in explanation of two microliths lying close to each other in square $x=9$, $y=7$ (Fig. 35: 44-45). There is no clear divergence in the distribution of narrow microliths and broad microliths.

The most obvious concentration of any artefact group is discernible in the distribution of flake-scrapers in Trench II (Fig. 111). On a surface of less than one square metre 11 flake-scrapers were found, a number that is higher than that of flake-scrapers elsewhere in Trench II. In contrast, no such concentration could be found in Trench I. Obviously, this type of artefact was used within the whole find-producing area.

Above, both artefact types and waste products that tend to concentrate are recorded. Some might be questioned, the significance of others is hardly doubtful.

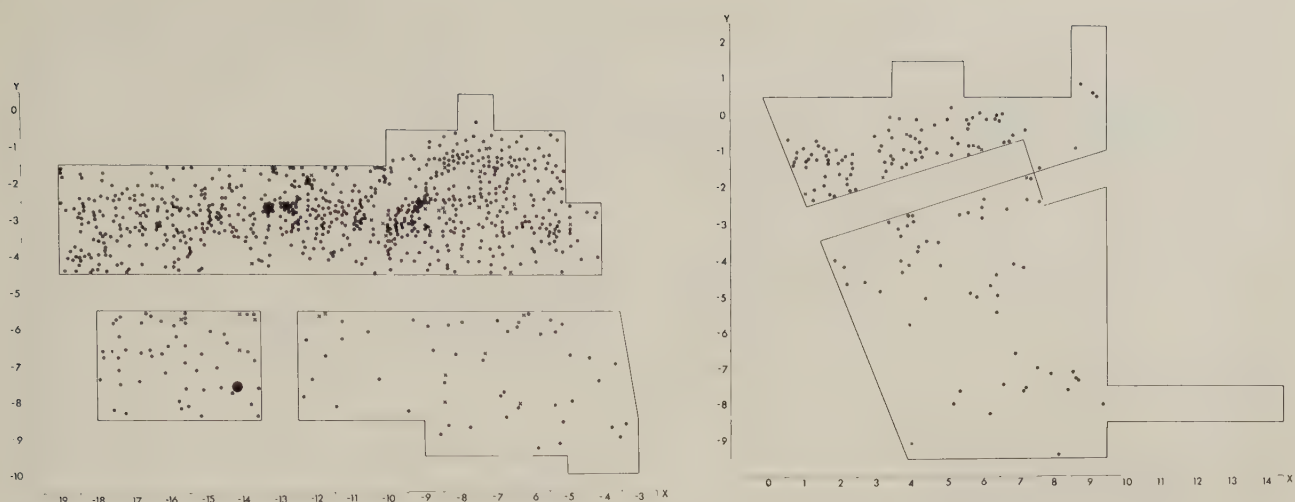


Fig. 110. Ageröd I:B. Distribution of narrow microliths (dots) and broad microliths (crosses). The large dot marks the position of the depot with narrow microliths.

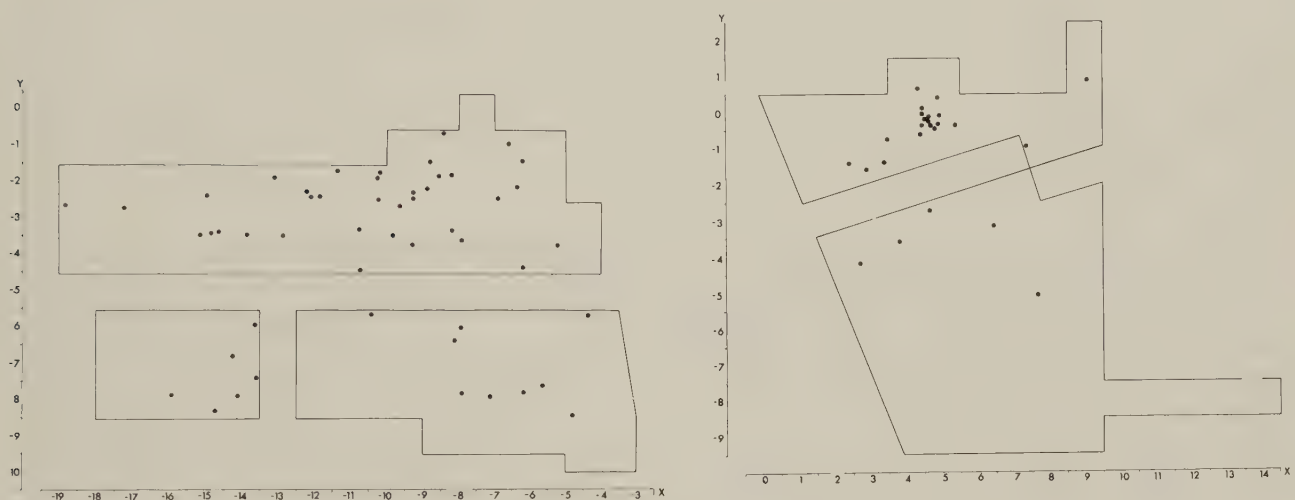


Fig. 111. Ageröd I:B. Distribution of flake-scrapers.

21.1.3. Ageröd I:HC

The isograms show two areas of find density in Ageröd I:B, one in Trench I and II each. The squares are calculated on the basis of 150 flints per 0.25 m^2 and, in consideration of some degree of erosion, would amount to $10 \times 3 \text{ m}^2$ in Trench I and to $8 \times 3 \text{ m}^2$ in the second area which largely lies within Trench II. They correspond to the size of Ageröd I:D. The stretched-out shape of the area has parallels in the spread of finds within Ageröd I:D and in the stone-setting presumed to be the floor of a hut in sub-Section H.⁶² This stone-setting had an oval shape measuring $8 \times 3 \text{ m}$. A number of postholes were documented some $0.5\text{--}1.0 \text{ m}$ from the edge on the inside of the stone-setting. The area delimited by the posts measured $6.5 \times 2.5 \text{ m}$. The stone-setting was located within the assumed shoreline and oriented parallel to it. Flint density was higher in adjoining areas. Along a 7 m long stretch facing the water no postholes were found, hence it may be assumed that the hut was open in this direction.⁶³

Notwithstanding the absence of both stone-setting and traces of postholes, the two areas densest in flints in Section B nevertheless correspond in shape, location and size to the structure in sub-Section H. It therefore seems justified to consider these flint concentrations as the remains of two huts. The validity of this hypothesis could to a certain extent be tested by studying the find distribution in Section HC, particularly in regard to the stone-setting.

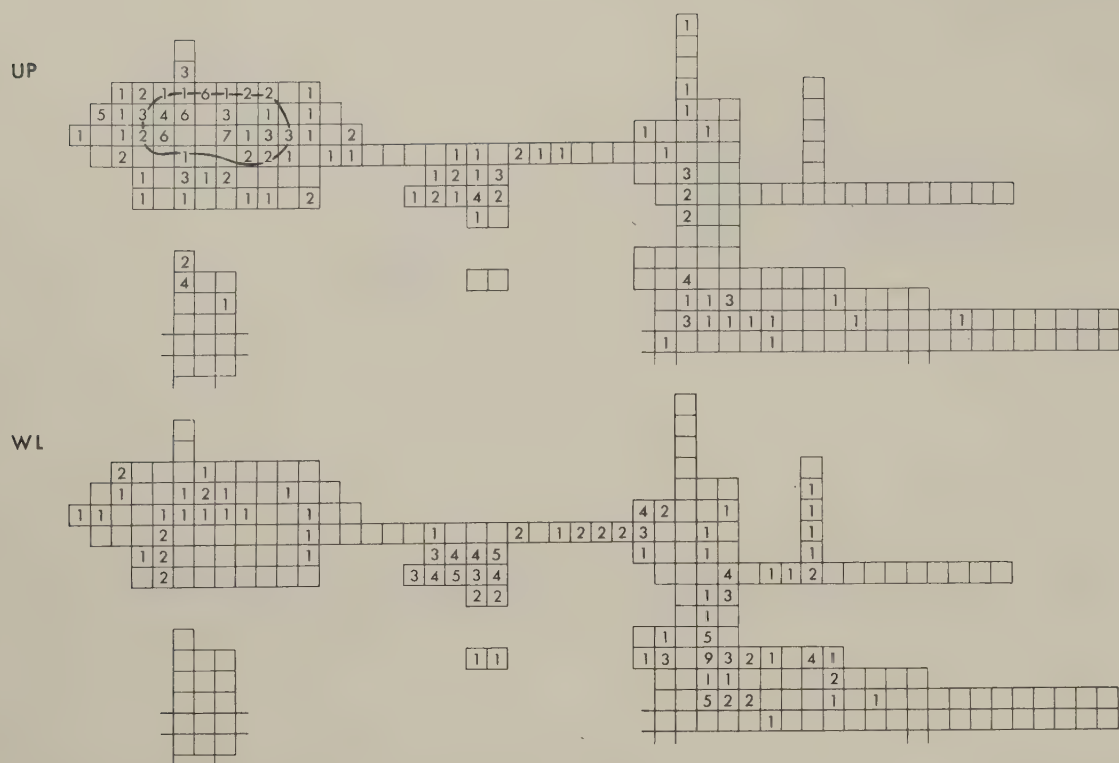


Fig. 112. Ageröd I:HC. Distribution of narrow microliths in WL and UP. A contour-line marks the position of the hut in UP.

The type of artefact most numerous represented, namely the narrow microliths, were placed according to the coordinators marked out in order to be able to discern possible existing tendencies for concentration (Fig. 112). In the case of UP, a clearly identifiable concentration to the assumed hut floor is noticeable. Moreover, there are a number of smaller concentrations in the central and eastern part, seemingly separated from one another. All in all, microliths in UP would be distributed in four different areas, one of which is clearly richer in finds than the rest.

WL also shows defined groups, but their position is somewhat different. In the western part of Section HC there are no concentrations – most of the find-producing squares are marked with only one example each. The highest figures are found in the central and eastern parts of Section HC, carrying 9 microliths per square metre. It would be unsafe to try to establish a clear-cut boundary line here, due to the circumstance that areas adjoining the spot yielding the maximum number of finds have not been investigated. Almost exactly the same is true in regard to the western part of the extension in sub-Section C excavated during the 1940s and the field in the central part of the section excavated in 1973–74 (Fig. 87). Whether distribution should be construed as being homogeneous or twofold has to be left an open question until the time when a complementary investigation can be carried out. The issue how distribution in detail should be evaluated may be subject to discussion, but there remains the basic fact that the two settlement layers WL and UP contain areas with more or, as it may be, less microlith frequency and that these at the same time mark the occurrence of other artefact types as well.

Thus, in each of these layers at least two concentrations of artefacts can be documented. One of these in UP can be connected with a hut floor. It would not be realistic to give any specific data about square area except for this latter concentration.

This oversight brings out a source of error which was neglected when types of artefacts were compared in Chapter 10.4. It has to be noted that artefacts are not spread evenly over the whole settlement area, but form concentrations in certain areas that probably were hut floors. There is a possibility that these concentrations were deposited at different times and the find material would consequently be "mixed".

It has to be noted that these comparisons can only give a general idea about prevailing tendencies of change. Fine nuances would be impossible to demonstrate validly in this kind of comparison. A number of find contexts that are widely varied in size are present here. Their spread over square area also varies as mentioned previously, i. e., the two beach-find concentrations Ageröd I:HC and Ageröd I:B. In contrast, the Ageröd I:D settlement has a well-defined area where artefacts are spread.

For testing possible differences existing within a larger find context, Ageröd I:B was selected since this site has an essential role in answering the questions raised. The intact narrow microliths from the find concentration in Trench II are separated from the rest of the finds, whereby a division according to

table LXXII, table LXXIII and table LXXIV is obtained. The arrangement clarifies that in spite of the considerable difference in numbers there is good agreement between microliths in Trench II and the remaining specimens of which the majority, 180 items, were found in Trench I. The correlation coefficient of the arrangement according to table LXXIII is 0.97 and of the arrangement according to table LXXIV, 0.99. This could be taken as an indication that microliths were produced for a relatively limited time in the whole find-producing area of Ageröd I:B.

Table LXXII. Ageröd I:B. Distribution of narrow microliths according to type.

Type	Trench II		Remaining area	
	Number	%	Number	%
Triangles	48	82.8	284	78.7
Lanceolates	2	3.4	28	7.8
Narrow trapezes	6	10.3	44	12.2

Table LXXIII. Ageröd I:B. Distribution of triangles according to position of retouch.

Position of retouch	Trench II		Remaining area	
	Number	%	Number	%
aI	22	45.8	132	46.5
aII	8	16.7	59	20.8
aIII	7	14.6	29	10.2
aIV	4	8.3	32	11.3
Left	7	14.6	32	11.3
Σ	48	100.0	284	100.1

Table LXXIV. Ageröd I:B. Distribution of triangles according to morphology.

Type	Trench II		Remaining area	
	Number	%	Number	%
1	-	-	1	0.4
2	3	6.3	13	4.6
3	20	41.7	117	41.2
4	16	33.3	105	37.0
5	9	18.8	48	16.9
Σ	48	100.1	284	100.1

To add one more test for relationships between the presumed hut floors, the intact triangle microliths from the concentration in and next to the stone-set hut floor in Ageröd I:HC, UP were also added. Correlating triangle microliths from the selected area in UP and other triangle microliths in the same layer, the coefficient 0.83 is obtained for the division according to position of retouch, but only 0.34 for division according to proportion criteria.

Correlating the triangle microliths from the hut in Ageröd I:HC, UP, Ageröd I:B, Trench II and Ageröd I:D the values are obtained according to table LXXV.

Table LXXV. Ageröd I. Coefficient obtained when correlating the types and position of retouch of triangles from the hut in Ageröd I:HC, UP, Trench II in Ageröd I:B and Ageröd I:D.

Typology according to Brinch Petersen et al.			Position of retouch		
	UP	B		UP	B
B	-0.14		B	0.82	
D	0.06	0.77	D	0.22	0.64

It emerges from the tables that the obtained correlation coefficients have the same tendency as the comparison of the total number of triangle microliths in each area, i. e., Ageröd I:B is more like Ageröd I:D

than Ageröd I:HC, UP according to the typology but more like Ageröd I:HC, UP according to the position of retouch.

21.2. Demography

Since it may be assumed that red deer constituted a considerable part, an estimated 1/4, of food, calculations of the red deer community at the transition Late Boreal-Early Atlantic period are an essential element of demography studies.

There are published attempts for evaluating the carrying capacity of cervides, foremost the red deer. By carrying capacity is meant the number of individuals able to survive in a given area without putting the relation between production and consumption out of balance. Some of these calculations were used as the basis of estimates of population density as well as the duration of the settlement period and applied to the present issue, namely settlement at Ageröds Mosse.

In regions having a biotope essentially similar to that of the Ringsjö basin during the period in question, population figures of red deer varying from 1.4 to 8.3 individuals per square kilometre had been denoted.⁶⁴ It must be noted that these calculations, in particular maxim, are based on communities having exceptionally favourable conditions. During severe winters, for example, some form of feeding was provided in most of the habitats. Although the red deer's biotope was good in prehistoric times, maximal figures were in all likelihood lower than nowadays. Taking the number of individuals as 2 and 6 respectively per square kilometre, representing two different estimates, the square area within a radius of 5 km - area I - would house 137 and 419 red deer respectively, while area II with a radius of 10 km would nourish 573 and 1,718 individuals respectively (Table LXXVI).

Table LXXVI. Calculations of population density of man based upon evaluation of popular density and carrying capacity of red deer.

	square area in km ²	Population density		Yield		
		Number of indivi- duals per km ²	Number of individuals	Number of individuals	Butchering weight, kg	Number of con- suments per year
Area I	69.8	2	136.6	23.3	3495	9.6
		6	418.8	71.2	10680	29.3
Area II	286.4	2	572.8	95.7	14355	39.3
		6	1718.4	292.1	43815	120.0

In some calculations a cropping of 1/6 of the population is considered to be a realistic harvesting figure.⁶⁵ But even considerably higher harvesting, up to 30%, is mentioned elsewhere.⁶⁶ Similarly high figures are documented for roe deer.⁶⁷ The result would thus be a harvesting of 23 to 71 animals in area I and 96 to 292 animals in area II. Applying the above given mean butchering weight, 150 kg, area I would be able to yield 3 500-10 700 kg meat for consumption, and area II 14 400-43 800 kg.

According to Clark, an average consumption of one kilogram meat per individual and day would provide the daily calorie need.⁶⁸ In following this estimate, a family of five would be able to support themselves exclusively on red deer for a period of at least 590 and at most 2 100 days in the smaller area alone. In other words, one family's yearly consumption would not be enough to keep the red deer population at a constant, stable level. To reach that goal, a minimum of 10 and a maximum of 29 persons would be required. In area II, the number of required human individuals would be 39 and 120 respectively.

Statistics on fishing in lake Ringsjön during the year 1885 were used to arrive at realistic calculations of the extent of fishing.⁶⁹ The yield for that year was 850 kg of fish per square kilometre of water surface. The catch consisted of pike, perch, bream, whitefish, roach, and eel. These calculations can be said to be applicable for determining that the catch within area I was as high as about 7,400 kg. Calculating from a combination of fatty and lean fish based on the proportions of different species of fish from the year 1885, the caloric content should be about 760 kcal/kg. Calculating from a daily requirement of the average 2,300 kcal, fishing should be capable of feeding 6.6 people per year, i.e., about one family group. These values should be seen as optimal, but nevertheless they provide comparative material which can be set against those calculations presented in regard to the amount of food which forest animals could provide. Fishing can contribute comparatively little food, a fact which is also clear from the calculations of population density based on fresh-water fishing with a maximum density of 0.1 persons per square kilometre.⁷⁰ Fishing was of greatest importance during limited periods of the year, for example during spawning, when the fish were easier to catch.

This kind of calculation is only one of several ways to estimate population density. According to data

on the yearly netto production and an assumed outtake of 0.5%, the number of persons in central Scania would vary from 1 to 9.4 individuals per square kilometre in the reed belt and from 0.3 to 7 individuals per square kilometre in the deciduous forest.⁷¹ The variation depends on how much of the food consists of vegetables counting from 100% to 0%. Taking into consideration the relation between reed belt and deciduous forest or coniferous woods, calculations result in 39-390 individuals for area I and 160-1,600 in area II. Going by the maximum calculation, the result would be a population of about ten times larger than the maximal figures of the first-mentioned method. This result appears to be completely unrealistic as far as the Ringsjö region is concerned.

Another method giving somewhat more realistic results is based on ethnographic parallels. But in-depth studies of hunter-gatherer populations usually deal with societies whose ecosystem is completely different from that of South Sweden during the Late Boreal/Early Atlantic period. The published calculations could hardly be applied to the present context. Instead, extreme maximal and minimal figures will have to serve as guiding lines. In environments such as the East Canadian Boreal forested belt a population density of 0.6-2.0 individuals per 100 km² has been assumed.⁷² This, however, seems too low a figure for the present case, for if it were correct, the Ringsjö region could have sustained only a maximum of 2 persons in area I and 2-6 individuals in area II. This can hardly be said to correspond to the consumption that the biomass seems to be able to tolerate.

In societies living in favourable conditions for a "Mesolithic economy" the number of individuals per 100 km² should be close to 15.⁷³ Thus, areas I and II could have sustained 12 and 47 persons respectively.

Naturally, these calculations are only meant to indicate the possible number of individuals within a given square area. In order to arrive at the maximal number of settlers it is also very important to study the occupational area of Ageröd I:B and Ageröd I:D. By analyzing settlements within a wide geographical range in respect to their respective location, an occupational area of 10 m² per person was deemed as adequate and necessary for daily activities carried out in the settlement itself.⁷⁴ Consequently, Ageröd I:D, having a surface of 30 m², would have been adequate for 3 persons. Since the site represents the remains of a seasonal habitation, it appears fully justified to assume that a family of 5 could have occupied it. Even reckoning with the lowest possible population figures, a group of this size should have been able to gain a stable sustenance all year round in area I.

The number of settlers at Ageröd I:B is conditioned by the way this settlement should be interpreted. Taken as a number of smaller settlements similar in nature to Ageröd I:D, about 5-20 separate seasonal habitations should have taken place, in which case the issue of food resources is comparable to that of Ageröd I:D (Chapter 10.2 and Chapter 21.1.2). In contrast, if the remains were traces of one and the same camp, the occupational area should have measured ca 200 m² in total. According to Naroll's calculations, the number of individuals would have been 20. If Casselberry's formula for camps inhabited by several families is followed, the number of people increases to 35.⁷⁵

It is evidenced that during the settlers' residence at Ageröd I:D at least one elk, one aurochs and one roe deer were consumed. The number of red deer and wild boar consumed is more difficult to calculate, but the osteological material represents at least two animals for each species (Appendix III). Calculated on the basis of the previously given weights of meat and daily calorie need, 5 persons would be able to survive for 228 days on a diet consisting exclusively of meat - 1,140 kg - if using up the energy intake to one hundred percent - which surely may be said to be unrealistic. Theoretically, an aurochs could sustain a family for about 3 months. In practice, however, the meat would begin to rot long before, and we have no information whatsoever on how capable Mesolithic man was of preserving his meat, although it certainly should have been possible to dry it. This method of preservation is quite feasible during the summer season even in an environment with high humidity and hordes of insects.

Since transporting the meat to the settlement was heavy work, less meaty parts of the game were probably removed at the scene of the kill. Of the ungulates, only the roe deer is an adequate weight for the normal carrying capacity of a man.

The so-called Schlepp-effect consists of skinning and quartering the carcass and using the skin as a container, dragging it along by the lower extremities left on it.⁷⁶ Had this procedure been used, it would be noticeable by the unproportionately high number of bones of the foot in relation to other preserved extremity bones. Although there are only a minor number of remains of aurochs in Section D, their ratio might indicate the above procedure.

Only in some species, among them brown bear, marten, fox and beaver, is a certain selective principle in Section B noticeable. All these species were mainly hunted for their pelage and were skinned in loco, leaving the hind quarters and the head of the pelage.

Even supposing that the carcass was emptied of blood and intestines where the animal was felled, an aurochs, for example, constitutes a heavy load and must have demanded the concentrated efforts of several persons to transport it. 5-7 men are necessary for transporting an elk carcass, whose weight nevertheless amounts to only half that of an aurochs. This leads one to assume that people probably strove to kill large game such as elk and aurochs as close to the settlement as possible, either by stalking them at

a nearby watering place or by organizing a drive. The overgrowing belt of dense reed and aquatic plant populations hereby formed a ready trap. Once driven into this zone, even the largest animal could easily be killed.⁷⁷ The large number of finds of all above-mentioned kinds of ungulates embedded in organogen sediment perhaps reflects precisely this method of hunting.⁷⁸ Some of these animals, for instance the Pre-Boreal aurochs from Vig, the Late Boreal elk from Taaderup and the aurochs from the bog Önnarps Mosse, have wounds obtained when they were hunted, although the majority probably just lost their way and perished in the waterlogged areas without the participation of any human agency.⁷⁹

21.3. Settlement patterns

In his treatment of the Early Post-glacial finds Welinder distinguishes three alternative settlement patterns in the typologically seen relatively abundant settlement material.⁸⁰ In his first settlement pattern, activity is limited to the area of an infilling lake all year round. It suggests a yearly cycle of summer habitation in the limnetic belt and a residence on solid ground not far from the edge of the water in winter. This pattern means moving short distances between summer and winter camps.

The second alternative proposes a habitation all year round on solid ground next to an open lake. The third alternative would also represent a habitation on solid ground, but not in conjunction to any open water. With the aid of various combinations of settlement patterns and flint types, Welinder sets up a pattern of two partly synchronous population groups. One of these would live through its yearly cycle near an infilling lake, while the other would exist all year round on solid ground close to a watercourse. His study ends with the conclusion that a differentiation of artefact types does not necessarily depend on chronologically conditioned factors. According to Welinder, the group dwelling on solid ground would have disappeared in the course of the Late Maglemose Culture.

In a study of extended scope on geographic locations of settlement, it is extremely important to scrutinize both the argumentations and the factual evidence identifying summer and winter settlement respectively. A number of indications have been advanced which favour the concept of assessing find layers in the limnetic belt as deposited during the summer season. The argumentation contending that settlements near infilling lakes would be winter camps is based on observations concerning the settlement Holmegaard V, so far only published in an interim report.⁸¹

21.3.1. Central Scania

When speaking about the Ageröd find context, Welinder finds it feasible to apply his hypothesis of a settlement restricted to the area of an infilling lake.⁸² The larger settlements close to the shore, i.e., Ageröd I:HC, WL, Ageröd I:HC, UP and Ageröd I:B would accordingly be the remains of winter habitation. In order to fix the settlements in their proper economic settlement pattern and societal structure, it is extremely desirable to demonstrate how constantly and at what seasons a settlement existed. It then follows to ask how well the material evidence from Ageröd I may indicate seasonal features.

We only have a rather sparse and ambiguous material available for answering this question. Nevertheless, there are at least some indications, among them the location of the site, the osteological material and the remains of plant food, that contribute to shed light on the problem.

As mentioned previously, the occupational layer proper in Section B is located on the southern slope of a beach bank. Underlying it is mostly minerogen matter or organogen sediment abundantly intermixed with minerogen elements. Therefore, this base is solid enough to support a stable settlement even in wintertime.

The location of Ageröd I:D on top of a one-metre thick layer of organic sediment constitutes a very convincing argument for viewing this settlement as a summer camp. Evaluating the water level of the surrounding lake poses problems. However, starting from the distribution pattern of artefacts and construing the southern part of the site as the actual refuse area closely connected to the then existing water surface, a basis of evaluation may be obtained. The stratigraphic studies indicate very minor variation in sediments in the horizontal plane. This would mean that even a minor rise of the water level could have had serious consequences for the settlement. Even to-day and in spite of thorough drainage, the area is mostly waterlogged during the winter.

The osteological material affords certain seasonal indications. When attempting to determine seasons of habitation, the make-up of cervine antler constitutes a very important factor.⁸³ In Section B there are antlers of both red deer and roe deer, and although they are in a fragmented state, the proximal parts, which are essential for a determination, can be identified. The material also contains two shed antlers of red deer. According to the diagram illustrating the growth of antler, fig. 113, the antlers must have been

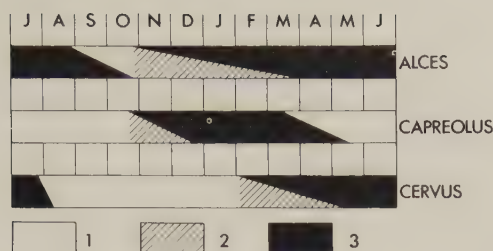


Fig. 113. Regeneration cycle of antlers of elk, roe deer and red deer. 1: full-grown antler, 2: shed period and 3: period of development.

gathered sometime between February and April, but this fact alone can hardly constitute a basis for determination of the season of settlement (Chapter 20, 3).⁸⁴ The two proximal parts of roe deer antler are probably, to judge by the find circumstances, parts of the same fully developed antler. Since very little practical utilization of roe deer antler is demonstrated in the abundant material from Ageröd I, it is reasonable to think that the specimens indicate the season when the site was occupied, namely summertime, stretching from April to October.⁸⁵

Another indicator of this season is a find of tench bones. It is practically impossible to catch this fish during winter when it lies dormant.⁸⁶ The same is true of bear and badger since they lie in their den.

The evidence of fur animals, on the other hand, would indicate a winter occupation, since their fur is in its best condition at that time. But this evidence is conflicting, in that fur animals are represented in Danish settlements belonging to the Maglemose Culture which, because of their location, must be interpreted as having been occupied during the summer season.⁸⁷

In Ageröd I:HC, UP remains of red deer calves were documented.⁸⁸ Since red deer calve in April-May, these finds are a definite proof that the site was inhabited in summer.⁸⁹ An important indication of summer residence are finds of roe deer antler with parts of the skull left (Fig. 113). The fact that there are no fishbones should not be considered too important in the light of unfavourable conditions of preservation.

Plant food is demonstrated in such abundant quantities in Sections D and HC that it can definitely be said to have been gathered deliberately. Hazelnuts ripen in August-September and must have been picked from the bushes before they would have fallen to the ground where rodents would soon have eaten them.⁹⁰ Hazelnuts may be thought to constitute an important winter store, but at Section D they more likely indicate an occupation of the site during the first autumnal months.

According to the above indications, the Ageröd I sites seem to have been occupied during summertime. Welinder's model, at least as far as Ageröd I is concerned, therefore seems incorrect. Consequently, and in accordance with Gräslund, the validity of certain details in Welinder's theory could be questioned.⁹¹ Every proposition of settlement pattern proposed by Welinder gives an impression of stagnation and isolation. The patterns could very well form the basis of two synchronous cultures within a restricted area as proposed by Bille Henriksen.⁹² In regard to our knowledge of the way of life of hunter-gatherer societies, a system of such stationary character is unrealistic.⁹³ Contacts of one or other kind are simply a necessary condition for the survival of a community.

21.3.2. The Coastal Zone

Before proceeding with a more thorough study of settlement patterns in the Late Maglemose Culture, another settlement area neglected by Welinder, namely the coastal zone, has to be dealt with in order to construct as solid a basis as possible for a hypothesis.

In Ageröd I:HC, WL and UP, bones of grey seal and a piece of amber were found. Althin thought this to be an argument for the existence of some kind of contact with the coast - here, the west coast of Scania is implied.⁹⁴ This is the most probable explanation, although it should not be disregarded that seal may have lived on the east and south coast too. The same holds true for amber which is just as frequent on the south-east coast of Scania as on the south-west coast. The seal bones from Ageröd I:HC consist of extremity bones, probably originating from the hind flipper of an old female grey seal, found in UP.⁹⁵ In WL, a perforated molar of grey seal was also found.⁹⁶

Very little is known about the topography of the Scanian south and east coast during the time in question. The development phase of the Baltic region during the Late Boreal and the early part of the Atlantic period is called the Mastogloia Sea after a marine diatom.⁹⁷ Studying transgressions along the coastal belt of Blekinge, Berglund demonstrated the occurrence of diatoms living in brackish water in the early BO 2.⁹⁸ Their ratio increases for the duration of the Mastogloia Sea. This phenomenon indicates that some kind of contact must have been established between the North Sea and the Baltic Sea. The diatom analysis does not indicate any abrupt alteration of salinity: thus it follows that the salt water currents penetrated via shallow and narrow channels. The upper time limit of the duration of the Mastogloia Sea is set at the start of a transgression during the later part of the Early Atlantic period, i.e., the Early Atlantic transgression. The Mastogloia Sea includes a regression phase of long, and possibly another phase of short, duration at the end of the BO 2. Mörner equates the Mastogloia Sea with a longer regression on the west coast, called ALV-3.⁹⁹

Little is known how and when salt water broke through via the strait of Öresund. Taking as a basis some older descriptions of submarine deposits and a few pollen-analyses undertaken on material coming from outside Copenhagen, Mörner attempts to fix the sea-level for the time prior to the Litorina regression.¹⁰⁰ Layers dated to the ALV-3 indicate a level of 15.25 to 12.8 m below the present sea-level.

C 14 datings of layers 8 m below present sea-level off Limhamn that are overlain by marine sediment gave the dates 6040 ± 160 b.c. and 5945 ± 115 b.c.¹⁰¹ C 14 reading of wood from 5 m below sea-level in the harbour of Landskrona which was also overlain by marine sediment gave the date 6150 ± 100 b.c.¹⁰² The sea-level of the southern Öresund at the transition BO 2/AT 1 reached a maximum of 15 m and a minimum of 8 m below the present sea-level. Since the threshold of passage of the Öresund strait lies at about 7 m below the present sea-level off Limhamn, salt water should consequently not have entered the Baltic basin before the Atlantic period.¹⁰³

Iversen starts from the same premises as Mörner and proposes a shoreline during the Late Boreal period at 13 m below the modern sea-level.¹⁰⁴ It follows that the shore should have been located between the equidistances of 15 m below sea-level and 10 m below sea-level respectively.

The difficulty in reconstructing the coast is not restricted to the problem of fixating the sea-level. Transgressions occurring subsequently may in certain parts of the Öresund strait have altered the floor topography quite considerably. The map, fig. 114, should be evaluated accordingly, keeping these sources of error in mind. During the time in question, the present Öresund strait formed a narrow inlet of the North Sea. The relatively great equidistance of the regions off the mouths of the rivers Rönne å and Saxå speaks for their having entered the sea one or a couple of kilometres further out than to-day (Fig. 114).

A narrow inlet reached southward to the latitude of Malmö. In this inlet there existed some parts with higher ground, forming islands or headlands. These, as well as the fact that the whole strait could easily be surveyed visually, should have made it easy to cross it even with small craft.

The distance between Ageröd I and the Öresund, as the crow flies, is to-day 34 km, differing only slightly from that existing during the transition BO 2/AT 1. The distance to the Skälderviken bay to the north-west is somewhat more than 50 km. Both these coasts could be reached by way of watercourses. To reach the latter, the outlet of the river Rönne next to the settlement would have been very convenient. To reach the Öresund coast, a branch of the river Saxå, which rises less than 5 km from Ageröd I, could be used. The course of the river and the point where it enters the sea also correspond to the shortest distance to the sea.

The coast near the mouth of the river Rönne is characterized by cliffs and stony formations which would be preferred by seal but which, on the other hand, render this section less navigable. To reach calmer waters, the mountain on the Kullaberg peninsula, a serious obstacle, had to be forced. The closer located coast of the Öresund was of an entirely different nature, largely reminiscent of a wide bay with an archipelago.

Right at the beginning it must be stated that there is no proof that the people who inhabited Ageröd I spent part of the year on the coast. True, the bones, the tooth bead of grey seal and probably also the piece of amber came from the coast, but these specimens may only be seen as proof of contacts having existed, directly or indirectly, between coast and inland. What the finds do prove, however, is that human activity during the Boreal period definitely existed in the coastal region.

The Maglemose Culture is often said to have been adapted exclusively to an inland environment. The basis of this contention is the lack of evidence of coastal settlement – for reasons quite natural since the beach, as mentioned previously, lay considerably lower than at present. Still, there are a number of indications that the coastal zone has been utilized.

On reviewing the osteological finds from the excavation of the inland settlement at Svaerdborg on Zealand carried out in 1923, grey seal was documented.¹⁰⁵

The two settlements Melsted and Norre Sandegaard on Bornholm, both dated to the Early Maglemose Culture, the latter dated to its youngest phase, are located about 100 m inland from the beach to-day.¹⁰⁶ In the Boreal period, the distance from the coast must have been some 500 metres, in spite of which the settlements might still have been of a coastal character.¹⁰⁷

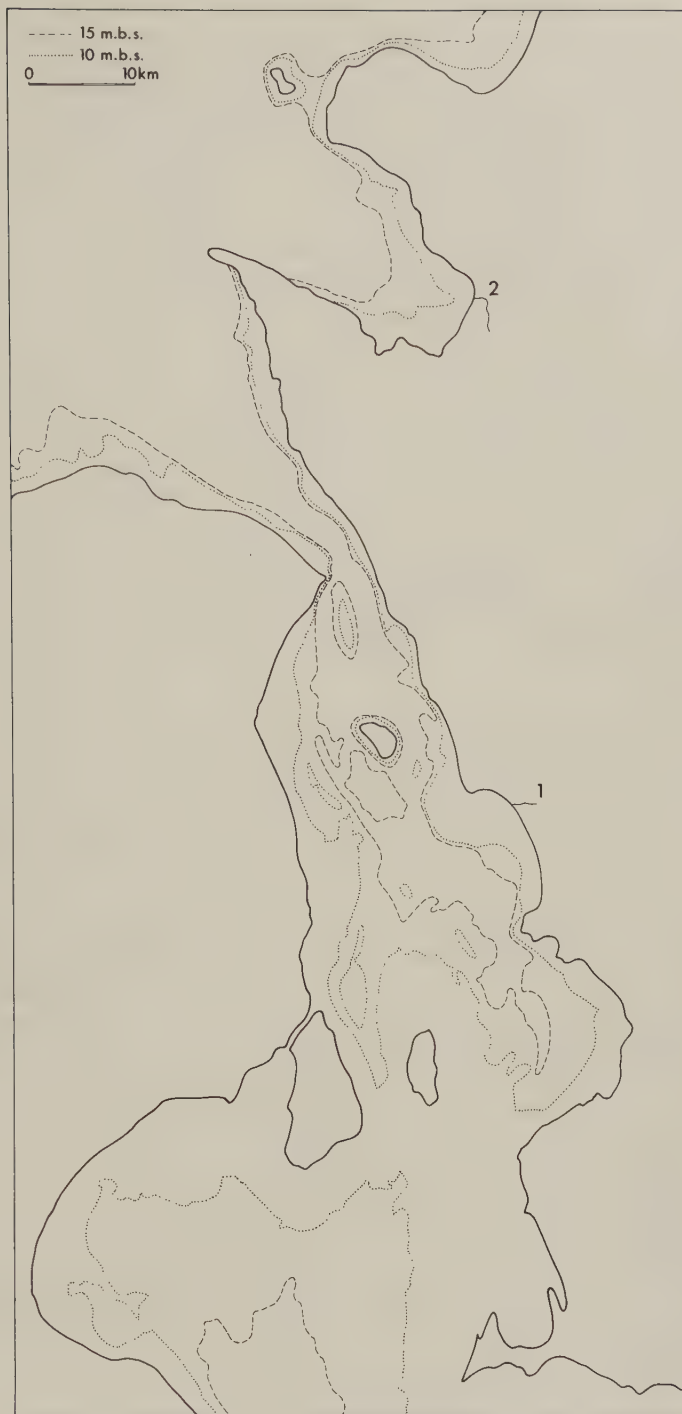


Fig. 114. Topography of the sea bed of the Öresund strait. 1: Saxån and 2: Rönne å.

At Tobisborg in south-eastern Scania another area yielding artefacts belonging to the Early Maglemose Culture has been investigated. Among the finds were four flint concentrations, probably indicating remains of hut floors.¹⁰⁸ The distance to the coast during settlement should hardly have been more than 1 km. Close to the south-eastern Scanian coast, Early Mesolithic settlements have been found in the Hagestad region.¹⁰⁹ In one of these a structure was uncovered which is interpreted as a hut floor. It is C 14 dated to 6700 ± 105 b.c.¹¹⁰

Finds from the bog Ulamossen in western Scania are of the same nature. When investigating a Late Neolithic culture layer, three micro-burins were found that probably belong to the Maglemose Culture.¹¹¹ In the south-eastern periphery of the bog, the so-called Fogdabacken, Mesolithic and Late Neolithic artefacts were excavated.¹¹² Very important is the find of a pit measuring 1×0.5 m whose fill consisted of humified sand. The pit contained more than 300 examples of worked flint, of which six microliths, both lanceolates and triangles, belong typologically to the Early Maglemose Culture. Particularly interesting

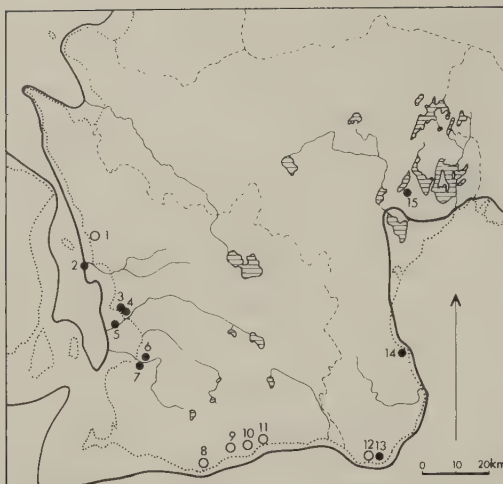


Fig. 115. Settlements (dots) and single finds (circles) in the coastal zone of Scania during the Boreal period. 1: Maglekärr, 2: Pilhaken, 3: Ulamossen, 4: Fogdabacken, 5: Lödde kar, 6: Bulltoftagården, 7: Segebro, 8: Espö, 9: Önnarp, 10: V. Nöbbelöv, 11: Sjörup, 12: Hagestad, 13: Hagestad, 14: Tobisborg and 15: Råbelövssjön.

is a fragmented example having a shape which suggests a barbed flintpoint.¹¹³ In Boreal times the find locality would have been about one kilometre from the coast.¹¹⁴

The settlements located at the Råbelövssjö lake should also be classed as having been close to the coast, since the Ancylus Lake covered most of the Kristianstad plain.¹¹⁵ Nor are the single finds of Boreal objects coming from the modern coastal region, for example the mattocks of elk antler from Maglekärr, V. Nöbbelöv and Sjörup in South Scania, to be neglected (Fig. 115).¹¹⁶

Recent marine archaeological activities resulted in the discovery of two submarine settlements. When the floor of the sea was scraped on the so-called Pilhaken, an underwater ridge which during the Late Boreal period was a stretch of beach near the mouth of the river Saxå, worked flints were found at a level of 18 to 6 m below modern sea-level.¹¹⁷ In spite of the considerable difference in level, the flints should be dated to the Boreal or the early part of the Atlantic period, since the first Atlantic transgression reached up to about 1 m above modern sea-level.¹¹⁸ That two flake-scrapers were registered among the rescued artefacts is one more reason to date the finds to the Maglemose Culture, since this type of artefact is only poorly represented in the Kongemose Culture.¹¹⁹

At the marine archaeological investigation of Lödde kar off the mouth of the river Lödde, worked flint was found at an approximate depth of 3 m.¹²⁰ When the author inspected the site a number of worked flints were found on the sandy floor of the sea. According to the transgression, the objects should be dated to the Late Boreal period or an early stage of the Early Atlantic period.

Data proving coastal settlement in the Boreal period are still very few in number since there is only one site, the one close to Pilhaken, which rightfully can be considered as coastal. The localities of the remaining find sites strongly suggest that the sea or the fresh water of the Ancylus lake was a zone exploited for hunting and fishing.

For comparative purposes it may be interesting to see to what degree coastal settlement can be traced via inland settlements belonging to the Kongemose and the Ertebølle Cultures respectively. The available material is poor in consideration of what we know of a very lively settlement activity on the coast. In one Ertebølle settlement at Åmosen on Zealand the point of a fin of a horned dog-fish was found.¹²¹ At the Ringsjökloster settlement on eastern Jutland, dated to the same culture, finds of ribs of a bottle-nosed dolphin were found.¹²² Some bones of Greenland seal, found at Sjöholmen on the western shore of the Ringsjö lake, probably belong to the Kongemose Culture.¹²³ Bones of seal found at the Øgaarden settlement in central Zealand probably belong to the Late Mesolithic period.¹²⁴

To be able to view the relation between coastal and inland settlement, it is valuable to gain insight into the economic preconditions in the two environments. However, the settlements documented close to the former shore from the Boreal period lack organic material. Only on the West Coast is it possible to study how the coastal region was exploited economically, Bua Västergård being the only site from which information about the kinds of hunted game and fish may be obtained.¹²⁵ 17% out of the total of 63 find units identified as mammals are marine animals, i.e. seal. The predominant element among the ungulates is the wild boar, 25%, followed by red deer, roe deer and elk. All four identified bird species as well as the four identified fish species are marine. These latter compose the largest ratio, namely 80% of identified vertebrate remains. The site was deemed, although with some caution, to have been a winter camp.¹²⁶

Seen from the economic point of view the osteological remains indicate marine fishing specialised for catching ling and coalfish demanding a different technique from catching fresh water fish.

Segebro is the oldest Scanian coastal settlement dated to the later part of the Early Atlantic period.¹²⁷ Since it is located close to the mouth of a river, it could be expected that the marine environment played an important role in providing food. This, however, is not the case. Only 10% of the mammal remains are from seal and small whale, as compared with remains of ungulates amounting to 85%.¹²⁸ Among the numerous species of birds only the eider prefers the open sea, while the others could be caught near the settlement at the mouth of the river. Three out of the seven identified fish species belong to a salt water biotope. In spite of the low number of identified species, fish constitute 16% of the total number of find units. In other words, no particular utilization of the extensive marine area can be demonstrated, with the possible exception of fishing.

The Arlöf settlement, located a couple of hundred metres from Segebro and dated almost one thousand years younger than the latter, shows no continuation of a specialized marine economy.¹²⁹ The percentage of find units of seal and small whale is only 3%.¹³⁰ 283 or 51% out of the total number of 553 fish remains are marine.

In the East Zealand settlement Ølby Lyng, dated to the Ertebølle Culture, seal and small whale remains together amount to some 12%.¹³¹ That fishing in the sea was preferred to fishing in fresh water is shown by the fact that only a single fragment out of 3,864 finds is from fresh water species.¹³²

In the three Atlantic coastal settlements on the Öresund coast that have been thoroughly examined by specialists in osteology, namely the sites Segebro, Arlöf and Ølby Lyng, the majority of the meat came from forest game, but small whale, seal and salt water fish were also an important addition to the diet. Dependence on forest game is still more pronounced at the Soldattorpen settlement from the Late Mesolithic period.¹³³

Although the amount of remains of mussels and oysters is quite impressive, the major part of food as it is reflected in the Danish kitchen-middens consisted of forest game.¹³⁴ Except for one, all other coastal settlements of Jutland from the Late Mesolithic have a ratio of marine mammals amounting to less than 10% of the total number of mammals.¹³⁵ The exception is the settlement Vængesø showing traces of an extensive hunting of whale.¹³⁶

Bone material from settlement on the Baltic coast during the Mesolithic is extremely scarce. In fact it is restricted to that of the Alby settlement on the east coast of Öland.¹³⁷ This settlement, dated to the Atlantic period, was probably a winter camp. The bone material indicates specialized seal hunting, bones of seal amounting to 91% of the total number of bones of mammals.¹³⁸ The ratio of porpoise, another large game, is somewhat less than 2%. Fishing seems to have been practiced mainly in the sea as shown by the ratio of cod, namely 96% of the total number of fish bone. The identified bird species also indicate a coastal marine economy. The site is the only known parallel to the South Norwegian find locality Frebergsvik from the Late Mesolithic, where all identified bone belongs to the marine fauna.¹³⁹

It may be said that settlement during the Atlantic period was a coastal culture, but it cannot be called a culture whose economy was mainly marine. Seen from a chronological perspective, the relation between forest game on the one hand and marine game on the other appears not to have changed extensively in the region of the Öresund strait. In contrast, the ratio of salt-water fish may have increased in relation to fresh water fish. But the economy of coastal settlements is surprisingly similar to that which is documented in the interior. This is probably due to the so-called edge-effect. By this is meant that animal life increases both quantitatively and qualitatively in a border zone between two different biotopes.¹⁴⁰ During the Atlantic period the coastal belt housed shrubs, grasses and herbs that were suppressed in the interior by the dense mixed oak forest. Although ungulates are usually associated with the forest, they thrive in an ambient offering access to a variety of ecological niches within a restricted area, as did the coastal region in this case. Therefore, a number of forest game could have been hunted within a short distance from the camp. The situation reminds us of that existing at Ageröd I during an earlier phase (Chapter 20.3).

The study of economy as it was in the Late Mesolithic coastal settlement can give us some pointers towards a hypothetical reconstruction of human activity that is proven to have existed during the Boreal period. The difference between the coastal and the inland environment was not quite as pronounced as during the Atlantic period, but existed nevertheless.

21.3.3. Environments favourable to man

In contrast to settlements of the Early Maglemose Culture, no settlements of the Late Maglemose Culture located close to an open lake or, contrarily, on solid ground without access to open water, can securely be dated to that period. Welinder opines that a settlement pattern limited to an environment without access to some larger watercourse disappears during the Late Boreal period.¹⁴¹ In the Atlantic period, the forest gets denser and this kind of inland environment is probably insufficient for sustaining a population group fit to survive. But during the transition from the Boreal to the Atlantic period there could still have been favourable conditions for settlement without access to open water, mainly in North Scania's morains which are poor in nutrients, as well as in the southern parts of central Scania which had abundant sandy deposits. Although several expanses of water had already been overgrown, there were at that time still a considerable number of large lakes or complexes of smaller lakes in existence.

The map, fig. 116, is an attempt to illustrate the three environments which may have been most important for settling, namely the open lakes, the coastal region and the infilling lakes. An area with a radius of 10 km with the camp in the centre is used as a model. The coastal region and the open lake region each consists of a number of likely settlement locations which together form a contiguous belt or a contour around a lake. The third kind of oblique shading denotes those regions which have conditions by and large similar to those of Ageröd I. The process of overgrowth of the lakes in southern and western Scania is well documented.¹⁴² Information about the North Scanian bogs is less exact. Thus, there may have been premises for settlement close to infilling lakes. Settlement on the shores of the larger inland lakes forms a more or less diagonal line running from south-west to north-east in Scania.

But there were also extensive areas in Scania which may not be classed as any of these three categories, for instance western Scania. This area is repeatedly intersected by a network of watercourses. The slightly hilly terrain contributed to waterlogging the area. To name an example, investigations of waterlogged areas or areas covered by water along the river Kävlingeå show that these had constituted 29% of the total precipitation area of the river before the drainage work of the past 150 years was carried out.¹⁴³ To-day the surface water covers 3% of the same precipitation area. Therefore, there were good potentials for a population of considerable size to sustain itself in this landscape with abundant water before the forest became too dense. Thus, it is entirely realistic to reckon with four different environments during the Late Maglemose Culture.

The next step in forming a theory will be to find out how these four hypothetical environments may be related to one or several settlement patterns. This issue is closely connected with the problem of what kinds of societal groups have existed in pre-agrarian society. Naturally, it is feasible to interpret the evidence of a settlement within a certain environment as evidence of a given settlement pattern. But more important is to find patterns mirroring a societal group's activities all year round.

The smallest societal unit was most likely that of a family. This assumption is clearly suggested by small settlements in the reed belt, e.g. Ageröd I:D, as well as evidence coming from recent hunter-gatherer societies.¹⁴⁴ However, a family unit could hardly have existed in isolation all year round.

In communities having similar preconditions to the present case, it seems that the basis of a more stable societal unit is a group formation of an average of 25 persons.¹⁴⁵ Ethnographic contexts also support the view that a group of 25 individuals would have a minimum capacity for surviving seasonal changes in food resources.¹⁴⁶ Thus, the most important task is to attempt to trace environments where a group of this size could survive. According to various methods for calculating the number of individuals within a "site catchment", as mentioned in chapter 21.2, a group of 25 can find sustenance all year round in a limited sector of central Scania. Let us now take a look at how a yearly cycle in this restricted area revolved.

The American researcher Jochim has taken into consideration and has estimated variables that affect preconditions of various animal species and thereby also the chances of catching them.¹⁴⁷ His intention was to establish a yearly cycle of hunting and fishing as it would have been practiced by a Mesolithic society living in the temperate deciduous forest belt. Such variables are the period of rut which affects the weight of the animals, alterations in size and composition of the herd, access to food and claving periods. Jochim's calculations were made with red deer, elk, roe deer, wild boar, beaver, fish, birds and small game. The result gave a yearly cycle of six hunting periods.¹⁴⁸ Although his calculations are based on South German conditions and cannot be directly applied to the present context, they are still useful pointers since they illustrate alterations in the time and the degree that game is attractive to the hunter in various seasons. In southern Sweden seasons arrived probably some 15 days later, respectively earlier, than in central Europe.

Taking into consideration only that time of the year when a certain species or a group of species is most attractive to the hunter or the gatherer, we obtain the schedule illustrated in table LXXVII. Accordingly, the year could be divided into two periods; April-October and November-March. The summer season would have been suitable for fishing and gathering, the winter for hunting ungulates. Even further de-

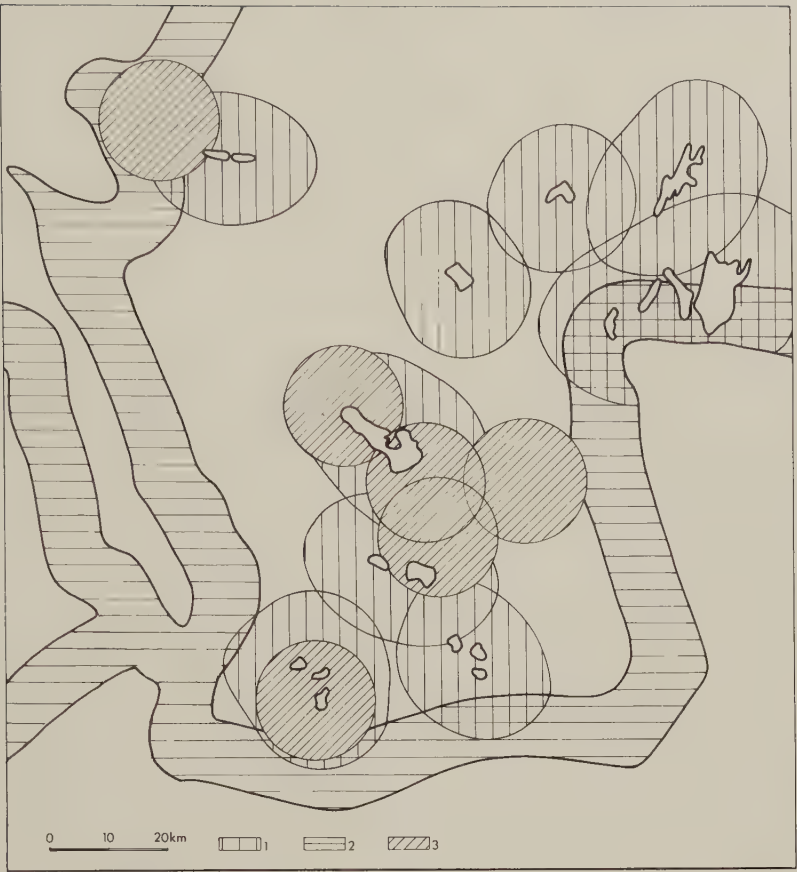


Fig. 116. Distribution of three environments most favourable to man at the transition Boreal/Atlantic period. 1: open lakes, 2: coastal regions and 3: infilling lakes.

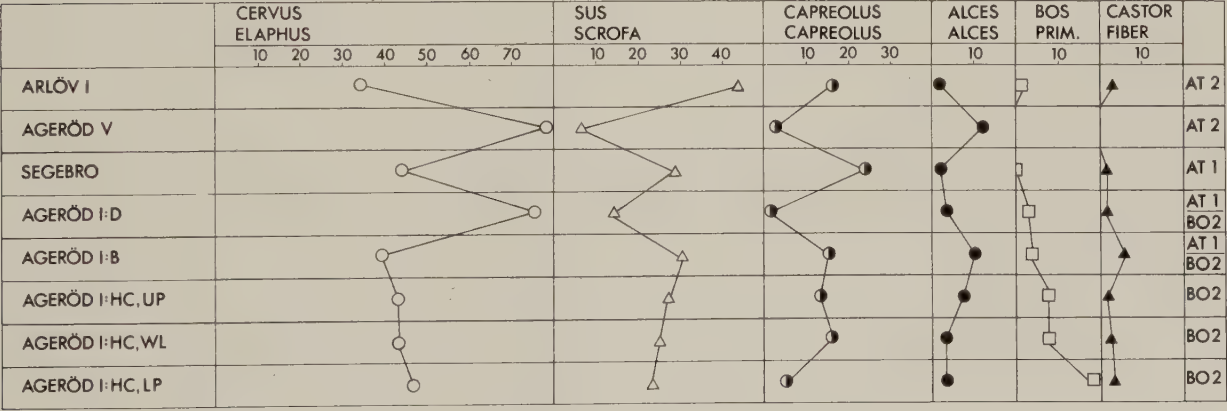


Fig. 117. Distribution of red deer, wild boar, roe deer, elk, aurochs and beaver in eight find-producing layers from both the Boreal and the Atlantic periods.

Table LXXVII. Predicted resource schedule.

	J	F	M	A	M	J	J	A	S	O	N	D
Red deer	-----								-----			--
Elk	-----											
Roe deer	-----											--
Wild boar	-----										-----	
Beaver	-----										-----	
Small game	-----					-----						--
Bird catching			-----							----		
Fishing				-----								
Plant food				-----								

tails may be observed in the table. In April the resources seem to reach their optimal conditions, while in the autumn no accentuated increase or concentration of the fauna seems to exist. The table could also be applied directly for studying seasonal indications.

Fig. 117 illustrates the ratios of the six most commonly occurring game animals from the settlements at Ageröd I and three younger find contexts. The latter are recorded in order to shed light on general changes of the fauna that might possibly have taken place due to fluctuations occurring in the flora or other factors working over a longer period of time. The concept of illustrating variation in the set-up of game has already been realized by Althin with, in part, the same find context.¹⁴⁹ In the present scheme two other sites, Segebro and Arlöv, were added.¹⁵⁰ In contrast to Althin's arrangement, Ageröd I:B and Ageröd I:D are taken here as two separate find localities.¹⁵¹

The two sites Ageröd I:D and Ageröd V differ distinctly from the rest in regard to their ratio of red deer. These two sites are also similar to each other in their low percentage of wild boar and roe deer respectively, a trend which seems to be contrary to what is generally observable. As an explanation why these two settlements differ from the rest, it is assumed that they represent a different season. If we apply Jochim's method to Ageröd I:D and Ageröd V, they should have been inhabited during that part of the year when red deer was a more coveted game than other ungulates. The period September-October then seems the most likely proposition. The rest of the settlements within Ageröd I belong to that part of the year when all ungulates are desirable prey, that is the periods January-April and May-August. Seasonal indications suggest the latter alternative (Chapter 21.3.1).

The diagram indicates a better agreement between the layers of Ageröd I:HC and Ageröd I:B than their relation to Ageröd I:D which is smaller both in surface and in the number of finds. Perhaps it could be used as an indication of different societal units as it might be, or rather, it would be quite natural that the economy of the settlements varied due to the size of the societal group inhabiting them.

It stands to reason to assume that both fishing and gathering would be favoured by a minor societal unit such as a family. In relation to the work involved, these activities yield the largest calorie intake, particularly since they can be carried out without having to move very far from the camp. All members of the family including mothers with infants could participate in the work.¹⁵² A larger group, on the other hand, would find better sustenance during the winter when hunt necessitates moving further away from the camp and preparation of the food would also involve more work. These two factors, movable hunt and stationary preparation of food, are seemingly conflicting. However, they may function in a societal group in which a number of individuals are occupied with hunting, setting out from a base camp, and another category of individuals prepare and preserve the food. Such a yearly cycle would probably also influence the selection of some particular environment. To be close to open water during the summer was important, since it made it possible to catch birds and fish and gather birds' eggs and plant food. In winter, good hunting grounds were preferred. Applying this argument to the Ageröd region, the location of all settlements there should indicate a summer residence.

According to factual evidence approximately contemporaneous with Ageröd I:B and Ageröd I:D, the distribution will be as illustrated in fig. 118. Only those settlements are included whose find contexts contain broad trapezes of type 4, namely Ageröd I:HC, UP, Ageröd I:E, Ageröd III and Sjöholmen. The first three are located within a distance of 500 m and thus could hardly have been settled at the same time. Sjöholmen, on the other hand, lies about 2 km from the other sites.

Unfortunately it is not possible to get a picture of the extent of Ageröd I:E, Ageröd III and Sjöholmen, since they contain artefacts from various time spans of the Stone Age.¹⁵³ Through Stadler's extensive reconnoitering, the bog complex of Ageröds and Rönneholms Mossar became that region of Scania in which Mesolithic settlement is best documented, and yet extensive parts of the bogs must be regarded as terra incognita. This holds true primarily of the southern and central parts of Rönneholms Mosse, but the northern parts of the bog Ageröds Mosse are also insufficiently known. The distribution of the settle-

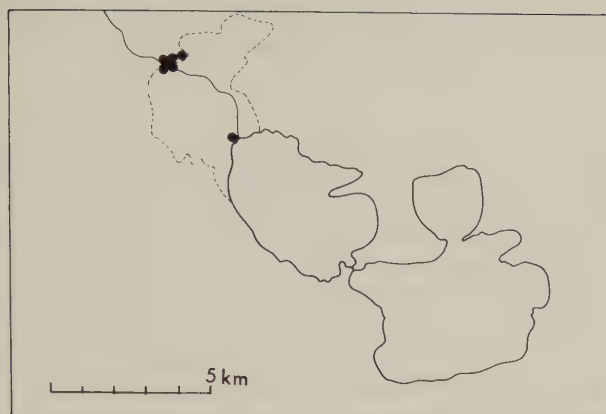


Fig. 118. Settlements in the lake Ringsjö area containing broad trapezes of type 4.

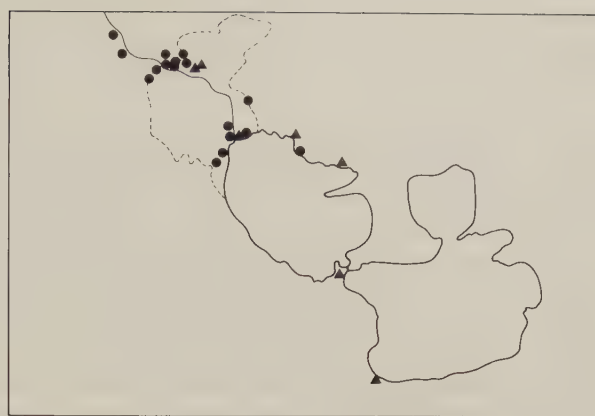


Fig. 119. Settlements in the lake Ringsjö area containing triangle microliths of Svaerdborg type and handle-cores (dots) and such containing handle-cores but no triangle microliths of Svaerdborg type (triangles).

ments is illustrated on the map, fig. 119, connoting find localities of the two most usual artefact types from the mid-part of the Mesolithic, namely the long and narrow triangle microliths and the handle-cores. That we have no information about the central parts of the bog Rönneholms Mosse is due to the circumstance that thick layers of sphagnum cover the overgrowth sediments there. In the southern and northern periphery of the bog complex evidence of human activity is lacking due to the difficulties of carrying out a detailed reconnaissance. Extensive parts of these areas are still grazing grounds, so that the ground surface is never bare.

Consequently a number of settlement sites might be located along the shores of the prehistoric lake without ever having been discovered. We also have examples of settlement sites, such as Ageröd IV, whose location is stated, but whose find context is too small to yield a secure dating.¹⁵⁴ The pollen-analytical investigation of Ageröd IV indicates settlement during the Late Boreal or the Early Atlantic period.¹⁵⁵ Thus, a number of minor settlements of family size might have existed during some part of the year around the infilling lake, just like Ageröd I:D. How the site Ageröd I:B should be interpreted is still unresolved. The distribution of artefacts indicates a pattern of at least two hut floors. Judging by the surface which documentably is covered by artefacts, Ageröd I:B could have incorporated one or two more huts.

Surveying the Mesolithic settlements in the northern Netherlands, Newell observed a system of size and shape of settlements.¹⁵⁶ Their size is calculated according to the distribution limits of the artefacts or waste products occurring in their find contexts. Basing his results on the analysis of ca 40 settlements from various phases of the Mesolithicum, Newell divided them into four sizes with the following mean values: A; 19.4x24.2 m, B; 4.2x8.3 m, and C; 2.4x3.4 m. Differences in the relative frequency of artefacts in the various settlement types emerged. Settlements of type B and C yielded high frequencies of certain artefacts, while others were nearly completely absent. It is held that the explanation of this is the fact that settlements of type A, due to their larger size, contained all activities necessary for the sustenance of the group inhabiting them, whereas settlements of type B and C would only have contained minor groups with specialized activities. One consequence of this investigation would thus be that the smaller the square area of a settlement, the fewer activities it would reflect, and the fewer the artefact types it would yield. Newell's theory about specialized activities in the smaller settlement areas could be tested on the previously treated material.

If there were a connection between the square area of a settlement and the number of artefacts, there should be differences in the ratio and the number of documented artefact types between Ageröd I:D and Ageröd I:B. The report presented in chapter 10.2 does not definitely support this hypothesis. Every artefact type documented in Ageröd I:B also occurs in Ageröd I:D, although the percentage of certain types sometimes varies in the two sites. In Ageröd I:D, for example, hammer-stones and grindstones, flake scrapers, blade scrapers, burins and retouched bulbar flakes and blades are over-represented. There is no secure indication that this is chronologically conditioned. Thus, it may be an indication of somewhat different activities in the two settlements.

There is no precise evidence suggesting that Ageröd I:B was inhabited by several families, but the

square area of the site corresponds rather well to that necessary for a group of 25-42 individuals (Chapter 21.2). Nor have any really weighty indications emerged from the previous treatment of Ageröd I:B showing that the site would be the result of repeated habitation by a group of the size of one family.

On the basis of theoretical calculations and factual evidence the following yearly cycle can be construed for the westernmost part of the Ringsjö basin; a population encompassing 5-7 families sustained itself in the region during the whole year. In late summer, when resources of both plant food and fish and birds were richest, conditions for splitting into independent small groups - families - were optimal, and camps established in the reed belt may have effectively functioned for a couple of months. Most of the winter, the same families lived in a common settlement, since getting food involved more work. The winter camp was probably located in another area than the summer camp. In springtime and early summer groups measuring more than a one-family unit may have moved to the shore for i. a. gathering birds' eggs and fishing. According to this outlined yearly cycle Ageröd I:D would have been inhabited in late summer or autumn, while Ageröd I:B may be thought to have been inhabited in an earlier part of the summer season.

On the basis of available calculations, a yearly pattern of activity may be reconstructed. Premises of settlement at those lakes that did not change in their nature could hardly have been different from those prevailing at infilling lakes. The yearly cycle outlined here may therefore also be valid for open lakes. This means that there should have been sufficient resources for a number of population groups of several families to survive within a relatively restricted area in Scania. However, anthropological evidence of settlement patterns of societies with a pre-agrarian economy shows considerably more complicated yearly cycles of environment, human activity and societal structure.¹⁵⁷

Even in Scania there are indications of a more complex picture of settlement pattern. Fig. 116 illustrates overlappings of various activity areas. Particularly in the central parts of Scania, contact areas connect nearly perfectly. Also activities near open or infilling lakes on the one hand, and utilization of the coastal zone on the other are evidenced in north-eastern and north-western Scania. Here, a group of several families may have moved from one environment to another in the course of the yearly cycle.

Flint is an important evidence showing that settlement at Ageröd I was not isolated from the world surrounding it. The analysis in chapter 20.4 demonstrated that access to flint was relatively easy. Transportation routes to central Scania from the Low Baltic morain, a distance of at least 12 km, had already been established during the early Post-Glacial period. We can only guess as to how the flint was brought to central Scania. Considering that a man could carry about 30 kg, it is really not a very important question how much flint was carried in all to the settlement, since the flint deposited in Section B amounts to no more than 7-8 carrying loads and that deposited in Section D would be less than one load.

There is evidence that hunter-gatherer societies conducted fully developed trade sometimes over considerable distances.¹⁵⁸ Nevertheless, it seems realistic to presume that the people inhabiting central Scania took care of the transport themselves. Perhaps this elucidates the present distribution too narrowly. There are north-eastern Scanian settlement sites yielding flint context whose raw material originates from the region affected by the Low Baltic Ice. These include Skeviaborg and Rävabacken, the latter located in the periphery of the bog Stora Mosse.¹⁵⁹ Both sites belong to an early part of the Boreal period, but nevertheless prove that flint has been transported over considerable distances. It could possibly be thought that the flint finds at the Ageröd settlements would constitute the first link in a successive long-distance trade.¹⁶⁰

Although it is true that find localities of flint are not far from the settlements and consequently may have been utilized by the population of central Scania, as demonstrated above, the same explanation may hardly be applied to the few but valuable finds of grey seal bone in Ageröd I:HC (Chapter 21.3.2).

Two alternatives exist for explaining contacts between coast and interior: on the one hand, trade, on the other, an activity pattern of moving from one environment to the other.

Andersen, taking as a basis finds from an inland settlement from the Ertebølle Culture on Jutland, outlines a settlement pattern with movements between coast and inland.¹⁶¹ But during the transition Late Boreal/Early Atlantic period conditions were completely different, so that his model cannot be accepted as an alternative without reservation. In Late Atlantic times the inland settlements may have been special camps for selective hunting. With regard to game, the dense, dark, and therefore not particularly productive forest was unable to sustain a continuous inland settlement. The High Atlantic coastal region, on the other hand, offered all the preconditions necessary to a stationary settlement.¹⁶² Comparing these premises with those valid for the Late Maglemose Culture in Scania, the picture we receive will be different, inasmuch as an inland population could very well survive then.

Similarly postulated movements between coast and inland in south-west Norway meet the same difficulties, i. e., the lack of ecological preconditions.¹⁶³ The movement pattern of hunter population groups between winter camps in the lowlands and summer camps in the highlands, advanced by Clark, cannot be applied to the Scanian context - mainly because of different topographical circumstances.¹⁶⁴ The ecological preconditions in Clark's model differ from those prevailing in Scania during the Late Boreal/Early

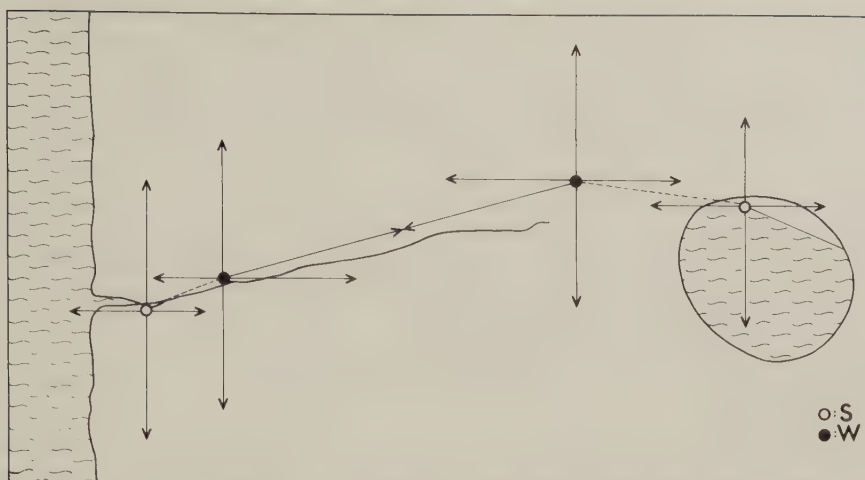


Fig. 120. Model of the relation between coastal and inland settlement. S: summer and W: winter.

Atlantic period. The result is that the most important game, the red deer, will demonstrate entirely different behaviour patterns – yearly movements over long distances in Pre-Boreal east England and a remarkably stationary way of living in the Scanian context during the time in question. Thus, the above related models, because of their differing ecological conditions, may be rejected.

Nor should it be disregarded that the difference between the coastal and the inland environment was not so pronounced as during the later part of the Mesolithic. In the centuries around 6000 b.c. there were many similarities in conditions for survival between the coast and the infilling lakes of the interior. In addition to a succession from an open and light Boreal pine-birch forest to a shady and dense Atlantic mixed oak forest, other dynamic transformations also take place in these two environments. While transgression raises the sea-level ca 10 m and submerges extensive parts of the coast, overgrowth of the inland lakes accelerates rapidly. This, however, need not necessarily be detrimental to man, as noted previously (Chapter 20.3). Factors that may be found at an infilling lake correspond by and large to features in an extensive estuary or a narrow inlet on the coast. For people who dwelt in the reed belt of an inland lake it should have been relatively easy to adapt to that kind of coastal environment. The nearby forest housed the same game as the surroundings of an infilling lake. Conditions for catching fresh-water fish and waders and swimmers were also similar. The difference consisted of the addition of one more food resource, namely the marine fauna. But, as mentioned previously, this element seems only to have been a marginal food supply.

Lively contacts between coast and interior seem on these conditions more than likely to have taken place. Bartering of such wares as seal meat and amber may have been practiced by the two kinds of hunters. Such contacts may also have had important consequences for the social relations of the diverse groups. Marriage, for instance, is a customary form of social contact in hunter-gatherer societies for preserving peaceful relations.¹⁶⁵

The areas not having access to the coast or a lake may have sustained a more spread-out population. However, it is the author's belief that these areas were utilized rather marginally by groups living at the inland lakes and on the coast (Fig. 120).

21.4. The relationship between Scania and East Denmark at the transition from the Boreal to the Atlantic period

Bille Henriksen, in her comparative study, finds it difficult to fit the finds from Ageröds Mosse into the Danish conjunction.¹⁶⁶ This is partly due to the two differing pollen zone determination that have been used (Chapter 11). But a great deal of problems also arise from the "incorrect" composition of the set of artefacts as seen in relation to the Danish context. The phenomenon can, at least in part, be explained by declaring the layers as mixed-up, but this does not solve all the problems. Dislodged or not, the majority of finds in Section HC and Sections B and D should be contemporaneous with settlements of the Late Maglemose Culture on Zealand.

The difference between Scanian and Danish settlement finds was said to be of chronological nature. Below, an analysis will be carried out to see whether there might be some other reasons for the two contexts being so different.

Leister prongs are represented by three specimens only in Section HC. Perforated pedicels of antler

and split wild boar tusks are not present in the Danish material. The remaining artefact types have parallels in both Scania and East Denmark. The interesting feature in their case is the ratio in which they appear as for example the axe sockets with prongs on the slotted bone points. There is some uncertainty for the latter, since examples made of bone might be replaced by ones of wood, as documented in Holmegaard.¹⁶⁷ In Ageröd I, no extremity bones with scraped facets are found, while they exist in Danish sites.¹⁶⁸

Microliths are the most noticeable flint artefacts. The triangle type is predominant (Chapter 11). Certain similarities between the types in Ageröd I:HC, WL and Svaerdborg I:C may be observed, but also differences that, set in a wider perspective, seem difficult to explain. One feature which is also difficult to explain is the frequency of lanceolates and narrow trapezes represented by higher percentage in Ageröd I than in any Danish site of the Late Maglemose Culture.

The relatively high ratio of stone axes also lacks correspondence in Danish sites. This latter difference may be explained by different access to raw material, since suitable stone was present in central Scania, but flint had to be imported.

Economic factors could also have influenced the composition of the assemblage. However, in this case the situation of the Scanian and the East Danish sites is the same. This also seems valid of the size of the settlements, showing both minor settlements situated on organogen sediment and larger areas of settlements with artefact-producing camps near the shoreline. That the ratio of red deer, roe deer and wild boar varies could hardly be the reason for related differences in size in the material culture.¹⁶⁹ According to seasonal indications both the East Danish and the Scanian find sites appear to have been summer camps. The existing differences can therefore hardly be connected with economical factors.

Studies on recent hunter-fisher societies distinguish societal structures based on numbers of individuals of 5, 25 and 500 respectively.¹⁷⁰ The first two groups were discussed in chapter 21.3.3. The latter entity is mostly labelled a dialectical tribe. This implies that the relationship existing between minor groups whose total number of individuals amounts to ca 500 is a precondition for maintaining linguistic and cultural distinction. Studies on a number of tribes in Australia show that when the number of individuals reaches figures considerably higher than 500, a split into two or more new, distinct main groups takes place.¹⁷¹

For long periods of the Early Mesolithic the number of individuals in minor groups living in Scania is too small to be able to form an independent group. Thus, it was a necessity to maintain contacts with either the Danish region or other parts of South Sweden. In consideration of the environmental factors, contacts in a westerly direction may be said to have been the most natural ones. The population was estimated to between 100 and 200 persons.¹⁷²

A more fertile biotope such as the Late Boreal forest could sustain a considerably higher number of individuals than previous ecosystems. Given such favourable conditions, population density may easily have doubled. It may seem exaggerated to assume a population explosion of this order in Scania, but considering that the Late Boreal period lasted 750 years, the yearly population increase will only be 1%.¹⁷³ As far as East Denmark is concerned, this would result in a high enough number of individuals, to correspond to that of a dialectical tribe. Calculating 5 persons per 100 km² and a total square area of 9,000 km² the result will be 450 persons. Scania, which at that time extended over 11,500 km², would have housed 575 persons. Scania and East Denmark together may have had a population of about 1,000 persons. This is more or less the number at which a split would take place. Geographical factors may also have brought about a new societal situation. A breakthrough of the sea during the Late Boreal period started probably via the present strait of Stora Bält, putting a barrier between East and West Denmark.¹⁷⁴ The land bridge between East Denmark and Scania was only a narrow strip leading to a minor part of south-western Scania. The logical consequence of an increase in population seems therefore to have been independent dialectical tribes living within the natural boundaries of the strait Stora Bält and the long and narrow Öresund inlet. The traditions of these dialectical tribes were identical, but their continued development, possibly due to somewhat different biotopes, became, for a time, more and more differentiated. This may serve as an explanation of a seemingly regional difference in material culture.

The alteration of the shoreline mentioned previously is not an isolated and specifically Scanian phenomenon. It effects the relationship of land to water to an even higher degree in East Denmark. According to the available maps, East Denmark was one contiguous territory around 6500 b.c. It was separated from West Denmark by a major outlet of the Ancylus Lake, denoted Dana älv.¹⁷⁵ Settlements used in the comparative analysis, e.g. Svaerdborg I and II, were located inland quite similarly to the Ageröd settlements. The coastal region lying closest to Svaerdborg was the western part of the Ancylus Lake.

During the later part of the Boreal period, extensive expanses of the lakes in East Denmark were filled by plant residue. This alteration of the environment did not occur quite synchronously with that taking place in Scania. Generally speaking, overgrowth was terminated sooner in East Denmark.¹⁷⁶ Simultaneously with the decrease of open water surfaces, the composition of the forest also changed. Just as in Scania, the mixed oak forest invaded gradually, and this process probably also started earlier in East Denmark than for instance in central Scania.

The transgression, beginning at this time, was also a factor contributing to the alteration of the landscape. Extensive areas came to be submerged. The result is a landscape radically different from Scania. The length of the coast is extended considerably and numerous islands and inlets come into existence.

Structural changes of settlement patterns as suggested in South Sweden in Early Atlantic times, namely increasing activities in the coastal region parallel to a minor number of inland settlements, may have started somewhat earlier in East Denmark.¹⁷⁷ The process there may be thought to have started during the transition Boreal/Atlantic period. The picture of East Denmark at that time should show affinities to that of the Late Atlantic period. It was calculated that during this latter period the greater part of East Denmark constituted the resource area of coastal settlement.¹⁷⁸ Due to the irregular coastline around Zealand, the centre of the interior was probably the only area not exploited by the coastal settlers. This is perhaps an explanation why settlement, which temporally is synchronous with Ageröd I:B and Ageröd I:D, is very poorly represented on Zealand. Settlements from this period should either be located on the coast or in the central parts of Zealand next to a large open lake. There is no evidence of the former category, since such settlements are below the modern sea-level. The prehistoric lake of the basin of the bog Åmossen had such dimensions that its infilling was concluded first in the Sub-Boreal period.¹⁷⁹ It is also the find locality of the only known broad trapezes of type 4. This may indicate that the proposed hypothesis concerning settlement patterns is correct.¹⁸⁰

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14. Nilsson 1935, p. 416, Sjörs 1967, p. 96.
15. Iversen 1973, p. 64.
16. Iversen 1973, pp. 67 f.
17. Iversen 1973, pp. 65 ff.
18. Iversen 1973, pp. 68 f.
19. Clark 1954, p. 14.
20. Broholm 1931, p. 19.
21. Lee 1968, Table 9 and Table 10.
22. Lekholm 1951, pp. 131 f.
23. Brinch Petersen 1973, pp. 107 f.
24. Clark 1952, p. 39.
25. Larsson 1978 a, Fig. 28.
26. Olsen 1961, Payne 1972 a, 1972 b, Uerpman 1973, Casteel 1977.
27. Clark 1954, pp. 15 ff.
28. Butchering weights were calculated by Johannes Lepiksaar, who also assisted the author in describing the choice of biotope and herd attitude of the various game animals.
29. Hanström 1960 b, p. 168.
30. Hanström 1960 b, p. 170, Ahlén 1965, pp. 318 ff.
31. Jarman 1972, pp. 131 ff., Wilkinson 1976, pp. 324 ff.
32. Jacobi & Tallis & Mellars 1976, pp. 315 ff.
33. Taber & Dasmann 1957, p. 237.
34. Cumming 1969, p. 259.
35. Cf. note 28.
36. von Essen & Pettersson & Sjödin 1968, pp. 43 ff., Ahlén 1977, p. 155.
37. Larsson 1978 a, pp. 52 ff.
38. Holst 1970, p. 93.

39. Larsson 1978 a, p. 37.
40. Ahlén 1977, p. 154.
41. Lepiksaar 1973, Fig. 2.
42. Larsson 1978 a, p. 50.
43. Wilsson 1971, pp. 207 ff.
44. Hanström 1960 a, p. 459.
45. Ahlén 1977, p. 139.
46. Hanström 1960 a, p. 504.
47. Degerbøl & Fredskild 1970, p. 204, Brinch Petersen 1973, p. 87, Liljegren & Welinder 1971, pp. 670 f.
48. Odum 1971, pp. 157 ff.
49. Tralau 1973, pp. 119 f., 1974, p. 247.
50. Ekström 1936, p. 75.
51. Gry 1932, p. 147.
52. Sandegren 1913, pp. 5 ff.
53. Ekström 1936, p. 75.
54. Nilsson 1967 b, p. 24.
55. Welinder 1971 c, pp. 181 ff., Brinch Petersen 1972, pp. 43 ff., Andersen 1973 a, pp. 18 ff.
56. Chmielewska 1961, Pl. XXIX, Leroi-Gourhan & Brézillon 1972, pp. 73 ff., Price & Whallon & Chappell 1974, Fig. 8.
57. Leroi-Gourhan & Brézillon 1972, pp. 257 ff., Larsson & Seip Bartholin 1978, Fig. 1.
58. Welinder 1971 c, Fig. 43:a.
59. Welinder 1971 c, p. 183.
60. Brinch Petersen 1972, p. 64.
61. Brinch Petersen 1972, pp. 49 ff.
62. Larsson 1975 a, pp. 12 ff.
63. Larsson 1978 c, Fig. 10.
64. Mellars 1975, p. 50.
65. Clark 1972, p. 27, Simmons 1975, p. 10.
66. Hanström 1960 b, pp. 167 f.
67. von Raesfeld 1956, pp. 223 ff.
68. Clark 1954, pp. 15 f.
69. Trybom 1893, pp. 44 ff.
70. Casteel 1972, p. 23.
71. Casteel 1972, p. 22.
72. Price 1973, pp. 459 ff.
73. Lee & DeVore 1968, p. 11, Tindall 1974, p. 326.
74. Naroll 1962, p. 587 f.
75. Casselberry 1974, pp. 119 f.
76. Perkins & Daly 1968, pp. 110 f.
77. Welinder 1971 c, pp. 175 f.
78. Liljegren 1975, pp. 53 ff.
79. Nilsson 1838, p. 96, Hartz & Winge 1906, Ødum 1920.
80. Welinder 1971 c, pp. 198 ff.
81. Becker 1953, p. 191.
82. Welinder 1971 b, p. 661.
83. Clark 1954, pp. 93 ff.
84. The figure has been set up by Johannes Lepiksaar.
85. Larsson 1978 a, p. 35.
86. Hanström & Johnels 1962, p. 215.
87. Brinch Petersen 1972, p. 74.
88. Determination by Herved Berlin, cf. Larsson 1978 a, Note 143.
89. Hanström 1960 b, p. 172.
90. Lindman 1964, pp. 147 f.
91. Gräslund 1974 b, p. 6.
92. Bille Henriksen 1976, p. 128.
93. Woodburn 1968, p. 107, Lee 1969, pp. 52 ff. Tindale 1974, pp. 14 ff.
94. Althin 1954 b, p. 153.
95. The bones were identified by Herved Berlin as deriving from harp seal (*Phoca groenlandica*). A re-determination by Johannes Lepiksaar has shown that they belong to grey seal (*Halichoerus grypus*). Cf. Larsson 1978 a, Fig. 29.
96. Larsson 1978 a, pp. 50 f.

97. Thomasson 1927, pp. 55 f.
98. Berglund 1964, pp. 37 f.
99. Mörner 1969, p. 299.
100. Mörner 1969, pp. 276 ff.
101. Persson 1962, p. 15. St-720 and St-732.
102. Mörner 1969, p. 358. Lu-19.
103. Iversen 1973, p. 74.
104. Iversen 1973, p. 73.
105. Degerbøl 1933, p. 376.
106. Becker 1952, pp. 97 ff.
107. Becker 1952, p. 159.
108. Strömberg 1976, pp. 11 ff.
109. Strömberg 1962, pp. 139 f., 1976, p. 19.
110. Lu-373.
111. Larsson 1973, pp. 8 f.
112. Callmer 1973, p. 139.
113. I would like to thank Dr. Johan Callmer who has put the find to the deposition of the author.
114. Welinder 1973 c, pp. 37 f.
115. Sundelin 1922, pp. 575 ff.
116. Salomonsson 1962, pp. 9 ff., Welinder 1971 c, pp. 36 ff.
117. Rausing & Larsson 1977, pp. 1 ff.
118. Mörner 1969, pp. 358 f., Digerfeldt 1975 a, pp. 23 f.
119. Rausing & Larsson 1977, p. 3.
120. Lindquist 1976, pp. 21 ff.
121. Noe-Nygaard 1971, p. 25.
122. Andersen 1975 b, p. 88.
123. Thomas 1954, pp. 183 ff.
124. Degerbøl 1943, p. 186.
125. Lepiksaar 1972, pp. 72 ff.
126. Lepiksaar 1972, p. 80.
127. Salomonsson 1971, pp. 32 ff., Larsson 1975 a, p. 19, 1978 b.
128. Unpublished determination by Johannes Lepiksaar.
129. Salomonsson 1971, pp. 38 ff., Larsson 1975 a, p. 19.
130. Unpublished determination by Johannes Lepiksaar.
131. Brinch Petersen 1971, pp. 6 f., Møhl 1971, p. 46.
132. Møhl 1971, p. 70.
133. Kjellmark 1903, pp. 37 f., Althin 1954 a, Fig. 10.
134. Troels-Smith 1960 b, pp. 112 f.
135. Degerbøl 1942, p. 79, Andersen 1960, p. 32, Andersen & Malmros 1966, p. 109.
136. Andersen 1975 a, pp. 42 f.
137. Königsson & Lepiksaar & Königsson 1971, Nilsson 1976.
138. Königsson & Lepiksaar & Königsson 1971, pp. 38 ff.
139. Mikkelsen 1975 a, p. 130.
140. Odum 1971, pp. 157 ff.
141. Welinder 1971 c, p. 199.
142. Nilsson 1935, pp. 400 ff.
143. Wolf 1956, pp. 56 ff.
144. Birdsell 1968, pp. 231 ff.
145. Birdsell 1968, p. 235, Clastres 1972, pp. 164 f., Price 1973, p. 472, Tindale 1974, pp. 11 ff.
146. Hassan 1975, p. 38.
147. Jochim 1976, pp. 22 ff.
148. Jochim 1976, p. 116.
149. Althin 1954 a, pp. 19 ff.
150. Cf. Note 128 and Note 130.
151. Althin 1954 a, Fig. 10.
152. Lee 1968, pp. 37 ff.
153. Althin 1954 b, pp. 76 ff., Thomas 1954, pp. 184 ff., Larsson 1978 a, pp. 67.
154. Althin 1954 b, p. 82.
155. Nilsson 1967 b, pp. 40 ff.
156. Newell 1973, pp. 40 ff.
157. Lee 1968, p. 31, Silberbauer 1972, pp. 302 f., Price 1973, pp. 459 ff., Coon 1976, pp. 215 ff.
158. Clark 1965, pp. 14 ff., Tindale 1974, pp. 81 ff.

159. Wihlsson 1950, pp. 66 ff., Althin 1954 b, pp. 124 ff. The excavation of Rävabacken was carried out by the author in connection with the find of a tanged point, cf. Larsson 1976, p. 12.
160. Stjernquist 1967, pp. 30 f.
161. Andersen 1975 b, pp. 88 f.
162. Vang Petersen 1976, pp. 85 ff.
163. Indrelid 1975, pp. 15 ff.
164. Clark 1972, pp. 33 ff.
165. Service 1966, p. 38, Williams 1968, pp. 130 f.
166. Bille Henriksen 1976, pp. 119 f.
167. Becker 1945, p. 69.
168. Henriksen 1976, pp. 99 ff.
169. Aaris Sørensen 1976, pp. 138 ff.
170. Birdsell 1968, pp. 231 ff.
171. Birdsell 1968, p. 233.
172. Welinder 1973 a, p. 8, Gräslund 1974 b, p. 7.
173. Cowgill 1975, p. 510.
174. Berglund 1964, pp. 37 f.
175. Iversen 1973, p. 58.
176. Liljegren & Welinder 1976, Fig. 9.
177. Brinch Petersen 1973, p. 85, Welinder 1973 a, p. 14, Gräslund 1974 b, p. 10.
178. Vang Petersen 1976, p. 94.
179. Troels-Smith 1943, p. 163.
180. Mathiassen 1943, pp. 54 ff., Andersen 1961, pp. 118 ff.

VII MAGLEMOSE CULTURE CONTRA KONGEMOSE CULTURE

22. The relations between the Maglemose Culture and the Kongemose Culture

As mentioned previously, the relationship of the Maglemose and the Kongemose Cultures was subject to intensive debate (Chapter 1.3.2). Unfortunately, this debate was mostly based on altogether subjective evaluations, since available data about i.a. chronology used to be very insubstantial. Therefore, before beginning a comparison of the two cultures, the chronological data, i.e., the C 14 datings, should be accounted for.

While the chronology of the Late Maglemose Culture has to be based by and large on the Scanian context, the Kongemose Culture is represented by radiometric assays from settlements both on Zealand and in Scania. The latter are from the coastal settlement Segebro and the inland settlement Agerød VI. The number of readings for the former is six and for the latter only two. The dates for Segebro are between 5440 ± 80 b.c. and 5020 ± 90 b.c.¹ The remaining four readings are distributed relatively evenly between these maximal and minimal dates. Both charcoal and bone were used for datings. Readings at Agerød VI resulted in 4860 ± 75 b.c. for charcoal and 5370 ± 80 b.c. for bark.² The former sample may be somewhat inaccurate since it may contain younger charcoal particles.³

From Zealand, a total number of twelve datings exist from the sites Kongemosen, Villingebæk and Månedalen.⁴ The two first-mentioned settlements are published in interim reports, while Månedalen is only mentioned in an index listing settlement sites of the Danish Mesolithic Cultures.⁵ The oldest dates in the Danish series are from Kongemosen and read 5610 ± 120 b.c., the youngest dates are from Villingebæk and read 5080 ± 130 b.c. With one exception, namely that of the charcoal sample from Agerød VI, the Scanian determinations fit well into this schedule. Thus, there is no concrete contra-indication that the Kongemose Culture would have been synchronous in Scania and on Zealand.

Difficulties of correlating Quaternary biological datings of the Scanian and the Danish zonal systems have been mentioned previously (Chapter 11). Therefore, the pollen-analyses from Zealand hardly contribute to define one's point of view in chronological questions. A survey of the pollen-analytical investigations from Scania shows that find-producing layers belonging to the Kongemose Culture in Segebro and Häljarp are younger than those of the Maglemose Culture, i.e., Agerød I.⁶ Comparing datings of the Kongemose Culture with those of the Maglemose Culture, a definite parallelism is hard to demonstrate (Fig. 121). Some of the C 14 readings from Agerød I give dates younger than 5600 b.c., but their value is dubious (Chapter 10.3). In a series of 20 samples, which this is, some deviations may be accepted without unduly discrediting the remaining determinations. The problem is similar to the one concerning datings of Svaerdborg I reading dates slightly older than 4000 b.c. which were disregarded because of the low collagen content of the samples.⁷

The youngest Danish dates are those from Ulkestrup.⁸ The latest date is 6080 ± 140 b.c. Consequently, Agerød I:D would so far be the youngest radiometrically dated settlement of the Late Maglemose Culture, dated to about 5900 b.c. This means that there seems to be a gap of about 300 years, lacking evidence of any cultural connection. It may seem that this lack of information about the Mesolithic development is a considerable shortcoming. But it has to be kept in mind that the artefact assemblages found at Agerød I:B and Agerød I:D are actually the only two of their kind found in South Scandinavia so far. The temporal gap in what we know about the early part of the fifth millennium b.c. may partly be due to the striking transgression that took place in the environment at that time (Chapter 21.4). Transgression raised the coast of the Öresund strait, and the coastal settlements were probably only inhabited for a short period, and, to make things even worse, they are now submerged and not accessible. In the interior, the forest became gradually denser. Overgrowth accelerated in most cases, and settlement in one and the same location was of short duration even in this environment. Since settlement was probably moved more and more off the former, solid beach, the remains would be more difficult to recover. Tracts close to open lakes were the only environment not seriously affected by climatic changes. To discover settlement remains under such circumstances is more difficult than to look for evidence of human activity which took place during an ecologically calmer period.

In spite of the name, the context of the Kongemose Culture poses considerable problems, since the eponymous site is only published in a very sketchy interim report.⁹ Unfortunately the same is true of the majority of settlements associated with the Kongemose Culture, such as Carstensminde, Gislinge Lamme-fjord, Vedbæk and Villingebæk.¹⁰ The way these settlements are published now, they are not suited to form the basis of a thorough analysis. Instead, the younger site at Segebro in south-western Scania was,

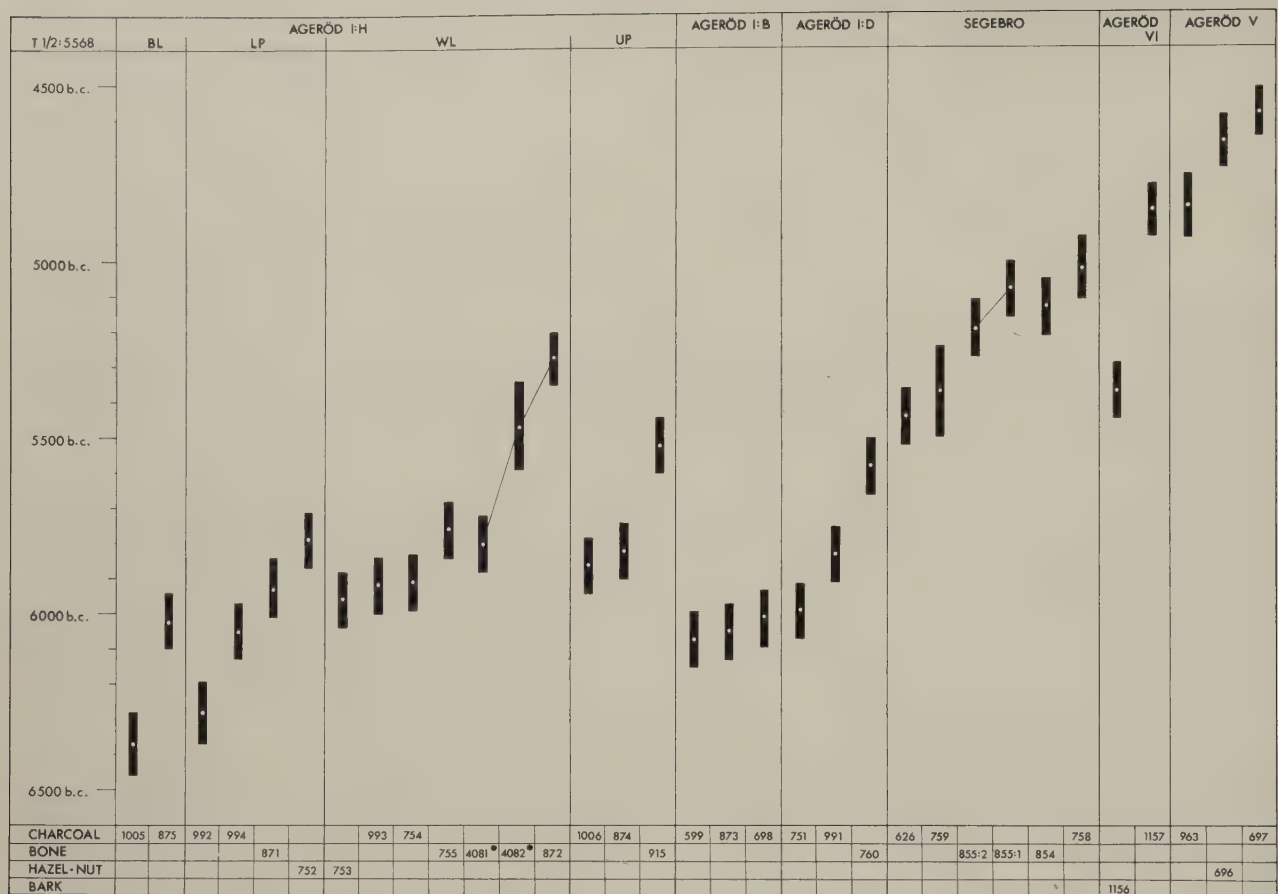


Fig. 121. C 14 datings of settlements from the Middle Mesolithic. Datings of samples from the same bone are connected with a line.

for several reasons, deemed better suited to correlation studies.¹¹ There, the artefacts were uncovered in the course of investigations which satisfy all the requirements of a modern archaeological excavation, such as a meticulous documentation by both archaeological and Quaternary biological specialists, the preservation of every flint artefact and a three-dimensional documentation of the in situ position of artefacts. It is also important that the sorting of artefacts was carried out by the same person, namely the author, both at Segebro and at Ageröd. It follows that the grounds for evaluation are the same in both cases.

Bille Henriksen, when discussing the relationship between the Kongemose and the Maglemose Cultures, demonstrated affinities evidenced by the artefacts of the two cultures.¹² She analyzes systematically factors that previous researchers regarded as indications of a pronounced difference between the two cultures, for instance different techniques for manufacturing blades and different styles of ornamentation. Bille Henriksen opines that these differences in manufacturing blades are not essential, but fails to present any clear-cut argumentation supporting her standpoint. She builds her hypothesis, just as most of the previous scholars have done, on purely subjective estimates. The author has tried to analyze this problem statistically by comparing the blade technique of a settlement from the Maglemose Culture namely Ageröd I:B, with that of a Segebro settlement (Appendix II). The method demonstrates both differences and similarities. However, these do not seem to be differences between the blade techniques of the two cultures.

Some scholars thought they could differentiate the two cultures according to how decoration was executed.¹³ Thus, the shallow incised motives would typify the Maglemose Culture, while the coarser, deeper incisions would be characteristic of the Kongemose Culture. Liversage, by conducting an in-depth study, advanced well-grounded arguments against this hypothesis.¹⁴ A good example supporting Liversage's assumption is the sandstone slab found in Trench D1, which has an ornamentation of shallow lines on one side and considerably coarser lines on the other (Chapter 9.14). But Liversage, and subsequently also Brinch Petersen, think that, on the other hand, there may be a difference of ornamental composition between the two cultures, the Maglemose Culture using more spread-out and overall ornamentation both vertically and horizontally than the Kongemose Culture.¹⁵ According to the two authors even the selection of decorative motives, as well as that of objects to be decorated, is different.

Bille Henriksen demonstrates parallels existing between the two cultures in regard to artefacts such as the pecked stone axes. The stone axe with shaft-hole is another artefact type existing in both cultures.

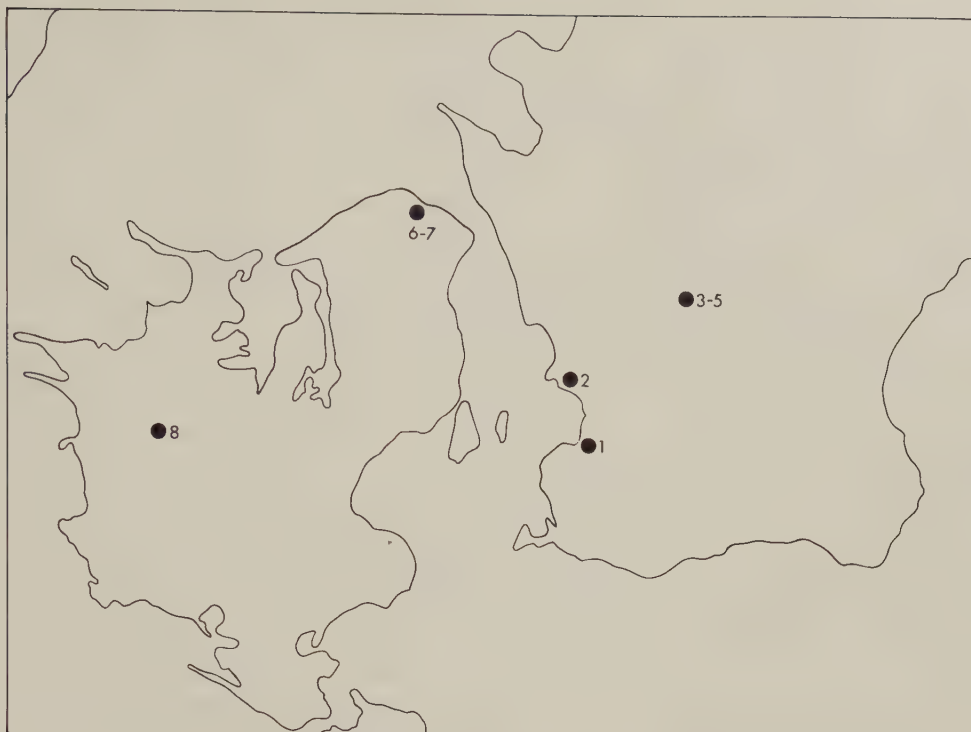


Fig. 122. Map of settlements from the Kongemose Culture mentioned in the text.

1: Segebro, 2: Ageröd III, 3: Ageröd V, 4: Ageröd VI, 5: Häljarp, 6: Villingebæk, 7: Månedalen och 8: Kongemosen.

The find of this type in Section B has a practically identical parallel in Segebro. The fragments found at the Kongemosen settlement site are probably of the same type.¹⁶ However, it has to be pointed out that certain settlements of the Kongemose Culture, e.g. Villingebæk and Häljarp, do not contain stone axes.¹⁷

Bille Henriksen pointed out that one of the few types of artefacts that differentiates the Maglemose Culture from the Kongemose Culture is the oblique arrowhead which does not occur in the former. The finds from Ageröd I:B contain a type of broad microlith - type 5 - that shows great similarity to the Early Atlantic oblique arrowheads. There are 15 trapezes of this type, which is 19% of the total number of broad trapezes in the settlement. The question is whether they are contemporaneous with the oblique arrowheads from the Kongemose Culture settlements, or represent a stage older than these.

Oblique arrowheads have previously been investigated and divided into groups. Unfortunately there are no established definitions.¹⁸ In large contexts of this type, it is unavoidable to notice that the group contains several forms. The variation in type is so extensive that it should be possible to make a subdivided typology. The precondition is that seriation has to indicate chronological differences. It is reasonable to assume that during the more than 1000 years this type has existed some changes would have occurred.

Mathiassen differentiated four special types. The difference between them consists of the measurements of the angle between the retouched and the unretouched sides and the relation in size of the two unretouched sides.¹⁹ These subjectively evaluated criteria should be defined more precisely.

Measuring carried out on an extensive context of oblique arrowheads coming mainly from Segebro suggests certain potential grounds on which to classify the type according to the relation between the unretouched sides, i.e., the relation A/C. The result is four variants with the A/C variations of 1-1.1 (a), 1.2-1.7 (b), 1.8-2.3 (c) and > 2.3 (d).

The first variant is mostly called the rhombic arrowhead and corresponds closest to Mathiassen's no. 96. The second variant has sides B and D angled somewhat differently in relation to side A. It may be equated with Mathiassen's no. 94, and no. 97. Divergence in the third variant increases, and it therefore corresponds most closely to Mathiassen's no. 95. The fourth variant has an extremely pronounced difference in length between side A and side C where the maximal value is about 3. The items in this group are in some cases parts of a point of a blade from which the oblique arrowhead was manufactured, and for this reason the termination of the retouch is the only difference between side D and side C. The mean value of width of the groups is only slightly different.

In an attempt to trace possible transformations of the type via the four variants, a seriation of a number of settlement contexts containing at least 15 measurable oblique arrowheads was set up. Only four Scanian contexts fulfilled the requirement: Ageröd I:B, Ageröd III, Segebro and Häljarp. To trace possible differences in the layer sequence of Ageröd III, its material was divided into two groups, namely the

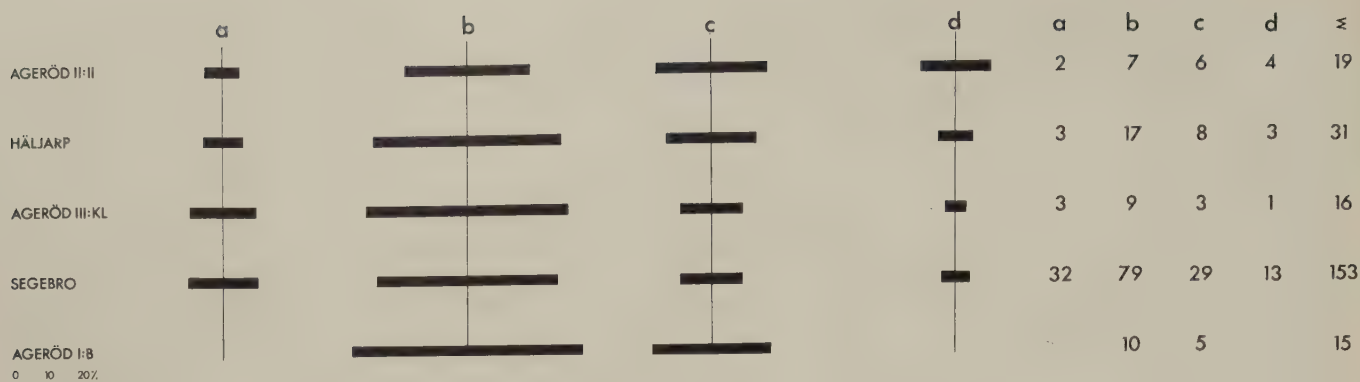


Fig. 123. Distribution of oblique arrowheads according to A/C relation.

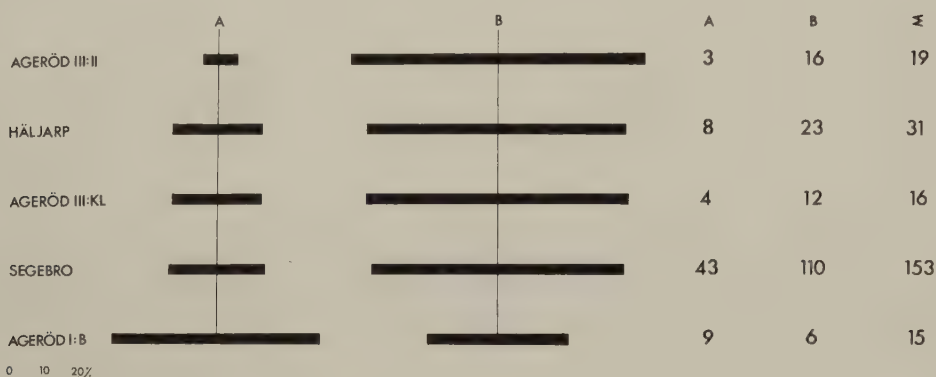


Fig. 124. Distribution of oblique arrowheads according to V^1 . A: $>45^\circ$ and B: $<45^\circ$

layers AIII:KL and AIII:II, which yielded the highest number of oblique arrowheads.²⁰ Distribution is illustrated in fig. 123. Values are arrayed into seriations and can also be compared, the absolute figures being on the right. The values are primarily differentiated from Ageröd I:B, where the variants b and c predominate. Segebro has the highest number of oblique arrowheads emerging from the correlation study. Bearing in mind this source of error, the differences between Segebro, Ageröd III:KL and Häljarp are only of subordinate importance, while the deviation from Ageröd I:B is so pronounced that it announces a real change of the type. Ageröd III:II is also so different from Häljarp and Ageröd III:KL that it could be said to demonstrate a change of the variants.

None of the oblique arrowhead contexts shows a clear division with regard to the angle V^1 . Nevertheless, in order to test the material with respect to the distribution of V^1 , within the already enumerated settlements, a division with the value of 45° as a borderline was made. Fig. 124 illustrates the seriation for the percentage having $V^1 > 45^\circ$, here called A, and the percentage of $V^1 < 45^\circ$, here called B, as the absolute figures for the respective settlements. It emerges that the order of proportion of the variants corresponds completely to that of fig. 123. The clear difference of Ageröd I:B and Ageröd III:II in relation to the three other settlements emerges equally well in this seriation chart.

This above analysis shows that broad microliths of type 5 from Ageröd I:B differ explicitly from those found at settlements of the Kongemose Culture. The difference shows that those from Ageröd I:B constitute the group which differs the least from type 4, predominant in the settlement. They are not as pointed as the oblique arrowheads from the Kongemose Culture, i. e., the retouched sides B and D angle less acutely towards the unretouched sides A and C. This can be exemplified by comparing the angles V^1 and V^2 of type 5 in Ageröd I:B and Segebro. In the former settlement the mean values of the angles are 43° and 112° while those in Segebro are 37° and 126° respectively. Thus, there are indications that examples of type 5 in Ageröd I:B could be interpreted as an early form of oblique arrowhead.

It is also important to note that the Segebro settlement contains only one example of a broad microlith with measurements that correspond to the definitions of type 4. The Häljarp settlement has no such examples.

The above treatment shows that broad microliths of type 5, i. e., oblique arrowheads in Ageröd I:B, display variations which differ partly from those found in the Kongemose Culture. It will therefore be difficult to insist on maintaining that the find context from Ageröd I:B contains artefacts from both the Magle-

mose Culture and the Kongemose Culture. Instead, similarities between the oblique arrowheads and broad trapezes of type 4 emerge. The latter have, as mentioned before, a high value for angle V^1 (Chapter 8.3.2). The relation A/C also has a distribution of the four variants which corresponds better to that of the oblique arrowheads in Ageröd I:B than e.g. in Segebro or Häljarp. The oblique arrowheads from Ageröd I:B are believed by the author to be the oldest examples of this type and to originate from other trapeze types, foremost type 4. This analysis brings to the fore one more indication of contacts between the Maglemose Culture and the Kongemose Culture.

With respect to other artefact types, Bille Henriksen also discusses the slotted bone points and the large picks typical of the Kongemose Culture.²¹ In their case, the Ageröd settlements, since they have a considerable number of finds of the former category, should be even better evidence of contacts than the Danish finds which have only one or a few examples in settlements of the Maglemose Culture.

In a discussion about the chronological position of the large picks, the Scanian material can only contribute two finds, a fragment in Segebro and an intact, 33 cm long example in Ageröd I:HC, UP. This layer contains mainly artefacts of the Maglemose Culture.²²

As reported, there are several similarities between the two cultures. But there are also explicit differences. The difference between flake and blade scrapers in the two inventories is quite pronounced. In the Ageröd I:B context the relation between flake and blade scrapers is 1:1, while in Segebro it is 1:6.5. Rectangular artefacts which are numerous in Ageröd I:B are completely absent in Segebro. Another factor to be noted is the ratio of antler and bone artefacts in relation to the total amount of bone. In Ageröd I:HC, WL, for example, the tools are ca 11% of the total amount of finds, while in Segebro they only constitute 1%. In this case the difference can not be explained by different conditions for preservation. The calculation is based on the total number of mammalian bones.

In a previous chapter (Chapter 21.3.2) evidence of settlement on the coast during the Boreal period was discussed. There is, however, yet another group of finds of "Maglemose type" on the coast, namely finds which were encountered in contexts belonging to the Kongemose Culture. Narrow microliths were found on Zealand in i. a. Blocksbjerg and Gislinge Lammefjord.²³ A few narrow microliths were found at Segebro and one triangle microlith was found at Häljarp.²⁴ The inland site Ageröd VI yielded one example of a narrow microlith.²⁵

How these finds are evaluated will be decisive in judging the relationship between the Maglemose Culture and the Kongemose Culture. Bille Henriksen opines that the two cultures existed simultaneously.²⁶ Therefore, she holds, the narrow microliths from the settlements of the Kongemose Culture would indicate direct contacts between the two cultural complexes.

An alternative probability leads to the conclusion that the finds evidence settling in the same place but at different time spans. A third explanation not altogether to be discredited would be that a minor number of narrow microliths were manufactured during the Kongemose Culture. Presupposing a cultural development from the Maglemose Culture to the Kongemose Culture, the change in microliths would have developed in such a way that the narrow types gradually decreased in number while the broad types increased. According to C 14 datings, this modification should be almost completed ca 5500 b.c. However, the report on the Kongemosen settlement, which seems to be the oldest representative of the Kongemose Culture, fails to indicate whether there are any narrow microliths in the find context.

It also has to be noted that there are artefacts of "Maglemose character" in settlement sites from a stage of the Mesolithic cultural development in which transverse arrowheads predominate. One such example is Ageröd V, C 14 dated to between 4850 ± 90 b.c. and 4590 ± 75 b.c.²⁷ The Maglemose element in this site consists of two triangle microliths.²⁸ A somewhat larger find context from the Early Maglemose Culture occurs at the coastal settlement site Bulltoftagården, which according to the changes in sea-level should be dated to between 4500 b.c. and 4000 b.c.²⁹ With these finds at hand we may raise the question: how great should a difference in time between dated find complexes be before a find association may be interpreted as something other than a cultural contact? The two above-mentioned alternatives, where, firstly, the combination of artefacts from the Maglemose Culture and the Kongemose Culture would indicate that one and the same region was utilized for two different periods and, secondly, that they would reflect a continuous utilization of the region in question, appear more and more realistic. As mentioned before when discussing human activity during the Boreal period in the coastal zone, there is evidence of settlement having existed a few kilometres inland from the coast proper. Certain settlements from the Kongemose Culture, such as Segebro, Häljarp and Villingebæk, are located in estuaries. But there are also examples of settlements from the Kongemose Culture located one or a couple of kilometres from the coast, such as some find localities near the river Saxå.³⁰ Locations near a riverbed must also have been attractive during the Boreal period.

It is worthwhile noting that certain parts of the above argumentation are also advanced in a study on the relationship between the Ertebølle Culture and the Funnel Beaker Culture.³¹

The animal food consumption of the coastal settlements of the Kongemose Culture is primarily based on forest game - red deer, wild boar and roe deer being the most coveted prey (Chapter 21.3.2). The number of well-investigated inland settlements from the Kongemose Culture is limited. Even scarcer is the avail-

able material of layers producing finds of bone that could give us an insight into the Atlantic economy of the interior. The osteological analysis of Ageröd V is the only one from Scania.³² The ratio of the larger forest game has a distribution which is in good agreement with that of Ageröd I:D (Fig. 117). In addition to these two settlements, the chart also reports the distribution within Ageröd I and the coastal settlements Segebro and Arlöv I. Percentages of the game hunted most in Segebro are in good agreement with those found at the Ageröd I settlements. Arlöv I also shows similarity to the rest of the settlements.

Some researchers regarded the absence of fish-bone at the Kongemose settlements as an indication of an extensive modification of the inland economy.³³ However, the interim report on the settlement Kongemosen mentions that fish-bone, although in limited quantities, has been found.³⁴ That finds of fish-bone were so few in number may be due to unfavourable conditions of preservation. The situation may be compared to that at Ageröd I:HC, where fish-bone is wholly absent and to Ageröd I:B, where fish-bone is only preserved in a carbonized state.

The settlements at Kongemose and Ageröd VI both show that the environment of infilling lakes rich in nourishment was utilized even during the Kongemose Culture. That settlement in this environment during the Atlantic period is poorly documented is probably more due to the fact that the overgrowth of the lakes was in a well-advanced stage in this period and not so much to the inland no longer being attractive for settling. In places where the ecological factors were still favourable to hunting and gathering in an overgrowth zone, evidence of human activity is to be found even from the sub-Boreal period.³⁵

A difference, here to be treated briefly only, may be seen in the societal structure. There are no finds from the Kongemose Culture representing the small camps of one-family size which are well documented in the Maglemose Culture. All settlements of the Kongemose Culture seem to be large ones, both with regard to square area and to the number of finds. Some, e.g. the settlement at Kongemosen, are of such large size that they have very few parallels in the Maglemose Culture.³⁶ But the difference between the find localities of the two cultures is not necessarily great. Even in the Maglemose Culture, as mentioned previously, there are several larger find localities in which two or more hypothetical hut floors can be distinguished such as Sværdborg I and Ageröd I (Chapter 21.1).³⁷ Even in settlements of the Early Ertebølle Culture, such as Ageröd V, a number of minor concentrations can be distinguished.³⁸

At Saxtorp, close to rive Saxå, a pit house measuring 5 x 4 m was excavated inside a large settlement. It might have been a hut used by a group of a family size.³⁹

In the course of an investigation of a settlement from the Ertebølle Culture on Vængesø, the outline of a hut foundation was documented which in size, but not in location, displays similarities to the small settlements of the Maglemose Culture.⁴⁰ From the Early Neolithic there are also remains of bog settlements of the size of one-family groups.⁴¹ Accordingly, it is possible to discern that in some cases the smallest social group of the Maglemose Culture, i.e., the one-family group, survives into the Late Mesolithic and in certain cases is an independent, self-sufficient unit.

The question then arises whether documentation of the small bog settlements of the Maglemose Culture possibly had the consequence that the description of the societal pattern during the Early Mesolithic period became somewhat incorrect. By this is meant that these settlements came to occupy an almost overwhelming position in descriptions of the "typical" Maglemose Culture. It is not entirely unreasonable to presume that the small bog settlements actually represent a marginal activity of the cultural pattern in question and are linked to a short-lived and restricted ecosystem. Several factors, such as the process of overgrowth and the development of the flora, have also contributed to particularly favourable conditions for hunting and gathering while the Maglemose Culture lasted.

All told, it may be said that the opinion arrived at in Bille Henriksen's study concerning correlations between the Maglemose Culture and the Kongemose Culture is correct. Similarities appear to be more important than differences. But the conclusion to be drawn from the comparison, seen in the light of the above-presented datings, will be that the two cultures did not exist simultaneously but are links in the chain of continuous change reflecting man's adaptation to a dynamic environment.

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VIII FINAL REMARKS

23. Final remarks

In summary, one can ask to what extent it has been possible to answer those questions which were posed in the beginning of the analysis (Chapter 2). The first question concerning the social structure and the physical environment during the transition period Late Boreal/Early Atlantic has been discussed in part VI. Changes in the culture complex in a homogeneous area have been illuminated through comparisons in the Ageröd complex, where the material culture as well as the economy and social structure were studied. Within the time period represented by settlement at Ageröd, certain changes in tool forms, which can hardly be linked to changes in the environment, have been confirmed. These tendencies to change must in this case be linked to a wider social environment, where changes in southern Europe have resulting effects as far north as southern Scandinavia. Neither can some contemporary influence from a circumpolar area be ruled out. On the other hand, the social structure does not seem to show any definite changes.

To the question of whether there could have been contemporary culture complexes with different compositions, the answer must be a categorical no.

Finally, the relationships between Ageröd I:B and Ageröd I:D are taken up for consideration. Chronological, economic and social phenomena which in one way or another could be linked to the study of Ageröd I:B and Ageröd I:D have been treated in earlier chapters.

It has become apparent from the analysis that there is no great temporal difference between the exploitation of Ageröd I:B and that of Ageröd I:D. The pollen analyses, in combination with the demonstrated rapid infilling, are important interdisciplinary complements for interpreting the period of settlement as being brief. C 14 datings also support this interpretation.

If one studies the location of the two settlements from the perspective of an infilling, the beach settlement at Ageröd I:B should be older than the bog settlement at Ageröd I:D. However, a stratigraphic division can neither support nor refute the idea of such a development. Since the difference in level at Ageröd I:D seems to be small, it is not unreasonable to see Ageröd I:D as a settlement which existed during a season when the water level was unusually low. The same group which had earlier exploited Ageröd I:B for settlement could, in a season, be forced to move further out in the reed belt in order to reach open water. The next settlement in the area can once again have been located on the beach.

Differences in the material, some of which could be more intensively examined in a local and regional perspective, as in the case of the narrow microliths, appeared in the comparative analysis. Here one could follow a local change in central Scania which was difficult to link to the change in east Denmark.

An analysis which was broader in space and time was required for other comparisons. The first appearance of broad microliths represents part of such an analysis. A comparatively rapid diffusion of this tool type can be detected in the material throughout Europe. But even local aberrations, such as distinctive types with limited distribution, occur, which does not facilitate arriving at an unequivocal conclusion.

The difference between Ageröd I:B and Ageröd I:D in regard to the different kinds of broad microlith forms has been further illuminated through broader study. At Ageröd I:B five different types occur, while all examples of broad microliths at Ageröd I:D belong to type 4.

It is evident from a comparison with younger material that the next most common type at Ageröd I:B - type 5 or the oblique arrowhead - as a whole distinguishes itself from the finds of the Kongemose Culture. If the oblique arrowheads from Ageröd I:B really represent a collection which is older than the comparative material, the question of how much older it is still remains.

Here it can be added that the oblique arrowheads from Ageröd I:HC, UP are in appearance more in accordance with those from the Kongemose Culture than with those from Ageröd I:b, so that no direct connection can be traced between these two settlements at Ageröd.

Not only type 5 but also types 1-3 are lacking at Ageröd I:D. These do not occur in the Kongemose Culture. In the continental settlement material, which is said to contain the oldest examples of broad microliths, it is more often the rule rather than the exception that these occur as some different types. Type 4 is nevertheless the type which dominates most often.

If the development of the broad microlith is to be the starting point for the chronological conclusions, then a considerable part of the material from Ageröd I:B should be contemporary with Ageröd I:D, while a lesser part should be younger. Ageröd I:B and Ageröd I:D cannot, in all likelihood, have been used during exactly the same time, and a direct move from the one settlement to the other seems to be a less

realistic possibility.

There exist certain differences between Ageröd I:B and Ageröd I:D which seem more difficult to explain in the light of what has been said previously. One of these is the different selection of game, with a marked predominance of red deer and the evidence of hazel nut collection at Ageröd I:D, while the latter is almost lacking at Ageröd I:B. From these differences one can see the possibilities for settlement during different parts of the summer season.

The analysis of the settlement pattern and social structures, to which Ageröd I:B and Ageröd I:D contribute an important part, yields as a result a complex picture, with the exploitation of many different environments and with different social compositions. This makes it possible to interpret the settlement at Ageröd I:B in many different ways.

The fact that one can detect tendencies towards concentrations of waste products as well as of tools at Ageröd I:B can be seen as evidence that the structure is not uniform, as it is at Ageröd I:D. However, it is clear from the distribution pattern and from an attempt at assessing differences between artefacts in the concentrations that the earlier discussed overview, arrived at through a comparison of the settlements, has not changed appreciably. Either Ageröd I:B sheltered a contemporaneous settlement of such a large group that it was necessary to raise more huts, or else the area was the object of exploitation by a smaller group for several seasons. If several non-contemporaneous settlements have come into contact with Ageröd I:B, this probably occurred in a short time period.

One argument for a single settlement at the site is how well the size of the settlement area coincides with the area calculated to have been the settlement size for a group of 3-5 families, which is thought to be the smallest economically feasible unit in the social pattern.

It is impossible to state a definite standpoint of view on the basis of the results of the various analyses concerning settlement at Ageröd I:B and Ageröd I:D that would not be assailable on one or even several points. However, in the opinion of the author, the differences existing between the two settlements are of such dimensions that Ageröd I:B and Ageröd I:D cannot be paralleled directly. On this basis the former settlement is considered to have housed one or several settlement phases, each consisting of a group of people numbering more members than the one-family size group, while Ageröd I:D constitutes the remains of a single one-family camp. Ageröd I:B was most likely used during the first half of the summer season, while Ageröd I:D was inhabited in late summer.

Regardless of how one interprets the relations between the two sites, the author is of the opinion that the sites reflect a stage which is generally based on a long cultural development which also contains new elements, and that one can see in this combination the beginnings of a change to Kongemose Culture - a change which, because of a lack of archaeological material, can only be roughly outlined.

It is clear that a definite answer to the determination of the relationships between Ageröd I:B and Ageröd I:D cannot be given. The settlements can, however, be seen in a larger perspective, in which the major lines have been hypothetically drawn. This makes testing in space as well as time possible. This work, which is included in the project entitled Early Atlantic Settlement in Scania, will, it is hoped, yield increased knowledge about man and his environment in the Early Atlantic period.

APPENDIX I

Comments on excavation techniques

In the report of the find material, finds from the investigation period during the 1940s were combined with those from the investigations during the 1970s. There is a certain difference in the two materials since the aim of the two investigations was not the same. During the 1940s, the excavation aimed at getting an idea about the extent of the settlement and the stratigraphic relation of the find-producing layers. A number of test trenches were dug and a minor surface was investigated in detail. Due to this circumstance the large and easily identifiable artefacts were paid more attention to than the smaller waste products. In the course of the excavations in 1971-73, large, contiguous surfaces were investigated in detail.

That the find material has a partly different composition is shown in table LXXVIII. Flints measuring less than 1 cm, i. e., bulbar splinters and splinters, constitute a considerably smaller proportion of the total amount of finds from the investigations in the 1940s than that of the investigations in the 1970s. The relationship between the amount of finds in layer 1 and layer 2 is also considerably different.

The percentage of finds from layer 1 is only 5.8% of the total amount of the material from the 1940s, compared to 21.5% of the total amount of the material of the 1970s.

Table LXXVIII. Distribution of flints in layers according to the excavations in the 1940s and the 1970s.

	Layer 1				Layer 2			
	1940s	%	1970s	%	1940s	%	1970s	%
Bulbar flakes	331	41.6	4812	37.3	540	42.2	18202	38.7
Bulbar splinters	7	0.9	722	5.6	260	2.0	2567	5.5
Flakes	432	54.3	6020	46.6	6561	51.1	21322	45.3
Splinters	25	3.1	1352	10.5	598	4.6	4965	10.5
	795	99.9	12906	100.0	12826	99.9	47056	100.0

When working on an investigation, the researcher has to count with the possibility that artefacts are liable to be overlooked in the course of the excavation, due to several factors. Individual experience in excavation, both in total and with respect to the particular type of ancient remains, is quite important.¹ General factors such as the weather or pressure for time may also affect the composition of the find material.

Failure to observe small flints may constitute a source of error of considerable dimensions, e.g. when comparing a given context with that of other settlements (Chapter 8.4). In order to get an idea about recovering frequency, i. e., the relation between the number of artefacts recovered by conventional excavation methods and such deposited on the site, the following experiment was carried out:

One square metre was selected for testing. Subsequently to normal excavation, all soil from layer 2 of this square metre was collected and put through a sieve. All material not passing through the 0.1 cm mesh was examined and all artefacts were collected. This resulted in 577 flints in the following distribution: bulbar flakes 27, flakes 26, bulbar splinters 192, splinters 311 and micro-burins 21. None of the flakes of the waste products reached a length of 2 cm.

Set in relation to the total amount of flint in layer 2 of the selected square metre recovered by both methods combined, the flints recovered in the experiment amount to no less than 26% of the total amount, but only to 3% of the total weight. The recovered micro-burins are dealt with in chapter 8.4.1.

In addition to flints, minor vertebrate remains were also found and these increased the fauna as it was known so far in Section B by two species, namely the wild cat and the tench.

The experiment proves that such meticulous examination of certain parts of the excavated soil may considerably increase information about the contents of the layers. In detailed examinations of both Mesolithic and Neolithic settlement layers, similar results proved to be important in the subsequent evaluation of both archaeological and zoological finds.²

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APPENDIX II

A study of the blades from Ageröd I:B and Segebro

Every complete blade has been included in the analysis of the blades from both settlements, and it is these which make up the material basis of the analysis. A blade was defined as a flake whose length was equal to or greater than twice its width.

The blades have been divided into three groups. Group I contains blades whose length is greater than 5 cm, while group II contains blades less than or equal to 5 cm whose width is greater than or equal to 1 cm. Group III, also termed micro-blades, includes those examples which are shorter than 5 cm whose width is less than 1 cm.

This division is partly based on Malmer's treatment of blades.¹ Within the category blades he distinguishes those which have a length of less than 5 cm, and in turn divides these into two main groups according to shape. The one group is included under the designation blades, but its members are to have a relationship between length and width which differs from those blades which are longer than 5 cm; while the other group is made up of micro-blades, with their special characteristics (See List of definitions).

Measurements of the negative traces left on the core by the removal of the blade, as well as a study of which principles of selection applied in the manufacture of different tool forms, were the main criteria used in this grouping of the blades.

As is shown in table LXXIX, a clear difference between Ageröd I:B and Segebro becomes evident when the blades are divided into groups. Only blade group II shows largely equal proportions at each settlement, while the proportions for blade groups I and III are different, with an over-representation for group I at Segebro and for group III at Ageröd I:B.

Table LXXIX. Distribution of blade groups in Ageröd I:B and Segebro.

Settlement	Blade group I		Blade group II		Blade group III		Σ	
	no.	%	no.	%	no.	%		
Ageröd I:B	94	13.0	178	24.7	450	62.3	722	100.0
Segebro	121	51.1	66	27.8	50	21.1	237	100.0

Source errors can lie behind the differences. The most likely one can be connected to the difficulties in observing the smaller flints, i.e., blade group III. In the heavily sandy layers at Segebro it would be harder to observe micro-blades than would be the case in the layers at Ageröd I:B. That this source of error is not relevant here is evident from the fact that the proportion of micro-blades does not show any apparent increase in those parts of the settlement in which the cultural deposits were sifted through a fine-mesh screen.

Even if one disregards blade group III, there nevertheless remain significant proportional differences between blade groups I and II. It is evident from the cumulative diagram in fig. 125:1 that the percentage of blade group I at Segebro is nearly as high as it is for blade group II at Ageröd I:B.

A number of variables have been investigated in order to be able to study the blades in detail. These are: length (L), width (W), thickness (T), the greatest distance between the blade's ventral side and an imaginary line between the ends of the blade (H), and the length of the longest unbroken ridge (R). Also the placement of W and T in relation to a division of the blade into proximal, central, and distal parts was recorded. The occurrence of calcareous crust was also recorded in the division; 0: no calcareous crust 1: calcareous crust which covers less than 25% of the dorsal side, 2: calcareous crust which covers between 25% and 50% of the dorsal side, and 3: calcareous crust covering more than 50% of the dorsal side.

The mean value or grouping of the variables can be read in tables LXXX, LXXXI and LXXXII.

It is evident from the calculations of the means for blade groups I and II that the values for the blades from Segebro are somewhat higher, while the differences in width (W), thickness (T) and height (H) are relatively small. In regard to the placement of width (W) and thickness (T), certain differences in the material are evident in that a larger number of blades from group I at Ageröd I:B have their greatest thickness towards the proximal part, while blade group II in the same collection has a larger number of blades whose greatest width lies at the proximal end. However, of more importance are the differences in both collections between blade groups I and II, where the former group has fewer examples with their greatest width and greatest thickness at the proximal part.

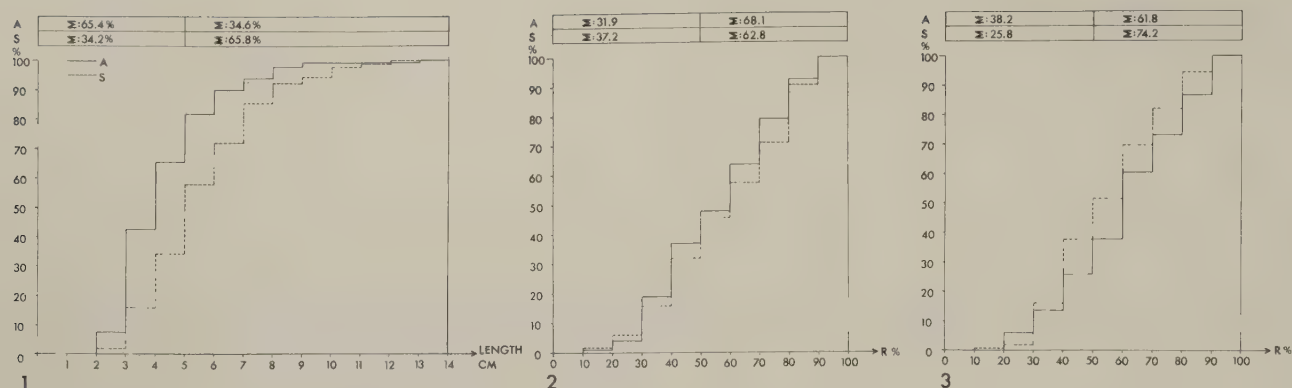


Fig. 125. Distribution of length (1) and the longest ridge of blade groups I (2) and II (3) at Ageröd I:B (A) and Segebro (S).

Table LXXX. Mean values or groupings of variables of blade group I in Ageröd I:B and Segebro.

	Ageröd I:B		Segebro	
	$\bar{x}$	Σ : 94 Md	$\bar{x}$	Σ : 121 Md
L	6.1	5.6	6.5	6.2
W	1.7	1.5	1.7	1.5
T	0.6	0.4	0.6	0.4
H	0.3	0.3	0.3	0.3
Placement of W	no.	%	no.	%
Proximal part	34	36.2	39	32.2
Central part	49	52.1	64	52.9
Distal part	9	9.6	18	14.9
Proximal + central parts	1	1.1		
Central + distal parts	1	1.1		
Placement of T	no.	%	no.	%
Proximal part	40	42.6	47	38.8
Central part	40	42.6	44	36.4
Distal part	13	13.8	28	23.1
Proximal + central parts	1	1.1	1	0.8
Proximal + distal parts			1	0.8
Distribution of calcareous crust	no	%	no.	%
0	54	57.4	62	51.2
1	21	22.3	33	27.3
2	17	18.1	22	18.2
3	2	2.1	4	3.3

Table LXXXI. Mean values of groupings of variables of blade group II in Ageröd I:B and Segebro.

	Ageröd I:B		Segebro	
	$\bar{x}$	Σ : 178 Md	$\bar{x}$	Σ : 66 Md
L	3.2	3.2	3.5	3.6
W	1.2	1.0	1.3	1.0
T	0.4	0.4	0.4	0.4
H	0.1	0.1	0.1	0.1
Placement of W	no.	%	no.	%
Proximal part	90	50.6	29	43.9
Central part	64	36.0	25	37.9
Distal part	21	11.8	11	16.7
Proximal + distal parts	3	2.7	1	1.5

Placement of T	Ageröd I:B		Segebro	
	no.	%	no.	%
Proximal part	88	49.1	35	53.0
Central part	50	28.1	21	31.8
Distal part	34	19.1	8	12.1
Proximal + distal parts	3	1.7	1	1.5
Proximal + central parts	1	0.6	1	1.5
Central + distal parts	2	1.1		
Distribution of calcareous crust				
	no.	%	no.	%
0	121	68.0	36	54.5
1	32	18.0	18	27.3
2	22	12.4	10	15.2
3	3	1.7	2	3.0

Table LXXXII. Mean values or groupings of variables of blade group III in Ageröd I:B and Segebro.

	Ageröd I:B		Segebro	
	$\bar{x}$	$\Sigma: 450$ Md	$\bar{x}$	$\Sigma: 50$ Md
L	2.1	2.1	2.2	2.1
W	0.5	0.5	0.4	0.5
T	0.1	0.4	0.1	0.2
H	0.1	0.1	0.1	0.1
Placement of W				
	no.	%	no.	%
Proximal part	206	45.8	18	36.0
Central part	189	42.0	26	52.0
Distal part	43	9.6	4	8.0
Proximal + central parts	9	2.0	1	2.0
Proximal + distal parts	3	0.7	1	2.0
Placement of T				
	no.	%	no.	%
Proximal part	237	52.7	19	38.0
Central part	127	28.2	18	36.0
Distal part	67	14.9	12	24.0
Proximal + distal parts	4	0.9		
Proximal + central parts	10	2.2	1	2.0
Central + distal parts	5	1.1		
Distribution of calcareous crust				
	no	%	no.	%
0	387	86.0	43	86.0
1	50	11.1	7	14.0
2	12	2.7		
3	1	0.2		

Calcareous crust occurs on a somewhat larger proportion of the blades from Segebro. However, the difference between blade groups I and II at Ageröd, where the occurrence of calcareous crust is greater in group I than in group II, is of greater significance.

No clear-cut linear correlation is evident from the values of the correlation coefficients for the four absolute values L, W, T and H, which are shown in tables LXXXIII and LXXXIV. It appears from study of the correlation diagrams, which were set up for each separate correlation, that the values were widely distributed and that a clear-cut grouping other than a linear one could not be confirmed.²

In his blade typology, Malmer uses the absolute proportion elements, as well as the relation between ridges on the blade's dorsal side and the length of the blade.³ Through a combination of a length-width relationship and a ridge-length relationship, the blades (groups I and II) are divided into A and B blades. Following the above discussion, one can ask if the division of blades can be linked to a meaningful element so that the blades can be ordered in a chronological study. Can the categorization be linked to a special technique and does this differentiate in a significant way between Ageröd I:B and Segebro? Many researchers have maintained that they see a clear difference in form or manufacturing technique.

In order to arrive at an answer to the above question, two values have been studied in detail; namely, the length of the ridge in relation to the length of the blade, and the angle between the platform remnants on the blade and its dorsal side.

Table LXXXIII. Ageröd I:B. Correlation coefficient of four variables of blade groups I-III.

Blade group I.	L	W	H
W	0.58		
H	0.33	0.44	
T	0.55	0.30	-0.01
Blade group II	L	W	H
W	0.61		
H	0.36	0.42	
T	0.27	0.03	-0.10
Blade group III.	L	W	H
W	0.48		
H	0.40	0.50	
T	0.63	0.34	0.38

Table LXXXIV. Segebro. Correlation coefficient of four variables of blade groups I-III.

Blade group I	L	W	H
W	0.33		
H	0.26	0.70	
T	0.51	0.17	-0.03
Blade group II	L	W	H
W	0.47		
H	0.31	0.40	
T	0.19	-0.11	-0.19
Blade group III	L	W	H
W	0.45		
H	0.45	0.44	
T	0.44	0.04	0.38

Figures 125:2 and 125:3 illustrate relationships between the length of the blade and the length of the unbroken ridge for blade groups I and II. For groups I and II at Ageröd I:B, the proportion whose longest ridge is shorter than half the length of the blade is 36.0%, while 64.0% have a ridge which is longer than half the length of the blade: a so-called complete ridge. At Segebro the relationships are 33.2% and 66.8% which indicates a slight difference between the collections. The division into blade groups shows that the proportion with a complete ridge at Ageröd I:B is somewhat higher for group I than for group II, while the opposite conditions occur at Segebro. In group III, the percentage with complete ridges at Ageröd I:B is 88%, while 12% lack this feature. According to Malmer's definition of micro-blades, those which lack complete ridges should not be included in this type.⁴ At Segebro the proportions are 78% and 22%, respectively.

Due to the difficulty of obtaining more exact values, the measurements of the angles have been divided into groups of 10°. The measurements, as well as their distribution among blade groups I and II and A and B blades, are shown in figure 126. There is a manifest difference to be seen between A and B blades at Ageröd I:B. While one can distinguish a marked concentration at angles between 90° and 105° for A blades, the values for B blades are evenly distributed, with values between 55° and 110°. Differences in length are here of lesser importance. The same distribution applies to the blades at Segebro, with the exception of A blades in blade group II, whose angle groupings better agree with those of B blades.

The angle between the platform and the dorsal side has been used earlier as a criterion for the division of blades and the technique that was used to make them.⁵ One often distinguishes between blades made by direct percussion and those made by indirect percussion.⁶ It becomes evident from measuring the angle that there exist differences in the appearance of the proximal part, depending on whether direct or indirect techniques have been used. Almost all blades with an angle of over 90° had a small platform remnant and an evenly rounded bulb of percussion, while many with an angle of less than 90° had a larger platform remnant and a cone-shaped bulb of percussion.⁷ These characteristics are connected to the technique which was used for removing the blade. There seems to be, at least at Ageröd I:B, a good agreement between the appearance of the blade's proximal end and the division into A and B blades. The former

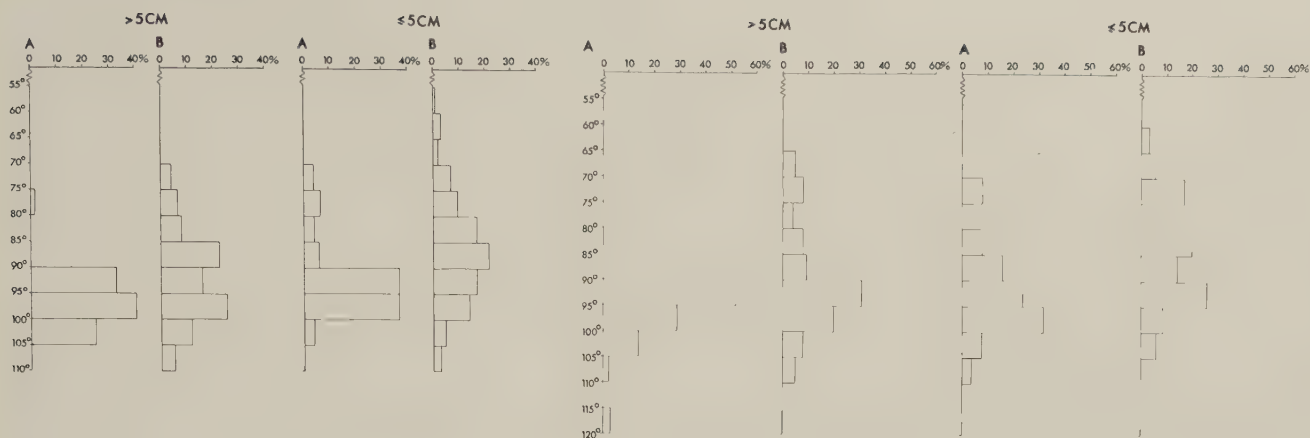


Fig. 126. Distribution of the angle between the platform remnants on the blade and the dorsal side in Ageröd I:B (1) and Segebro (2).

have been removed with the help of indirect percussion, the latter with the help of direct percussion.

A clear difference was observed when the relationships of A and B blades and the distribution of calcareous crust were more closely examined. At Ageröd I:B only 29.6% of the A blades have calcareous crust, while as much as 80.4% of the B blades have it. Probably the B blades, more often than the A blades, were produced during the primary working of for example the blade cores.

Differences as well as similarities between the blades at Ageröd I:B and Segebro are evident from the above account. The most marked difference occurs in the percentage of micro-blades, with a high proportion at Ageröd I:B and a low proportion at Segebro, while in form there does not seem to be any difference other than that the percentage with a complete ridge is somewhat lower at Segebro. The relationship between micro-blades and micro-blade cores indicates, on the other hand, a significant difference, with the ratio 59:1 at Ageröd I:B and 13:1 at Segebro. It seems as if micro-blade cores were not used as intensively at Segebro as at Ageröd I:B.

The percentage of blade group I is higher at Segebro than at Ageröd I:B. On the other hand, there does not seem to be any qualitative difference between blade groups I and II. It is possible that access to larger flint nodules can have been an important factor. Flint occurred abundantly in the area around the Segebro settlement, but it was necessary to transport it a significant distance to reach Ageröd I:B. In the latter settlement the cores were more intensively used than at Segebro.

In summary, the investigation does not indicate the clear-cut contrasts between blades, such as a clear difference between Maglemose and Kongemose culture, which have been stated in earlier works.⁸

REFERENCES

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2. The blade materials were subjected to computer analysis at Computer Centre of Lund. The author received help from Lennart Månsby in the programming and computer analysis.
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4. Malmer 1969 b, p. 25.
5. Andersen & Blankholm & Blankholm 1968, pp. 71 f., Welinder 1971 c, pp. 114 ff.
6. Crabtree 1968, pp. 446 ff., Bordes & Crabtree 1969, pp. 6 ff.
7. Brinch Petersen & Jönsson & Vang Petersen & Aaris-Sørensen 1977, pp. 153 f.
8. Troels-Smith 1957, p. 126, Brøndsted 1966, p. 102.

APPENDIX III

Bone remains from the Mesolithic settlements Ageröd I:B and Ageröd I:D

By Johannes Lepiksaar.

1. Identification

Only ca 10% of the analyzed bone pieces found at the investigations in 1971-73 in Ageröd I:B could be identified as to species, since the bones were extensively fragmented. The material of 1971 yielded 22%, that of 1972-73, 4%.

Wall-thickness of the fragments

The morphologically unidentifiable fragments of mammalian shaft-bones have the following wall-thickness distribution according to table LXXXV.

Table LXXXV. Thickness of unidentifiable shaft-bones.

mm	1	2	3	4	5	6	7	8	9	
	3	36	61	28	37	13	8	8	1	Total
		x	x	x						Roe deer
			x	x	x	x	x			Wild boar
			x	x	x	x	x	x	x	Red deer

Comparing the wall-thickness frequency of morphologically unidentifiable shaft-bone fragments with that of the above-mentioned three most important ungulates, it emerges that of the former at least 20% or, more likely, about 40% of the fragments derive from shaft-bones of roe deer. At least 5% of the fragments exhibit a wall-thickness exceeding that of wild boar, i. e., must originate from red deer, elk or aurochs. Fragments with a wall-thickness of 3-7 mm may stem from wild boar as well as from red deer, particularly those with a thicker wall.

2. Fragmentation

The length of the largest identifiable piece measures nearly 87 mm. In the finds of Ageröd I:D from the years 1947-49, investigated by H. Berlin, an intact shin-bone measuring 370 mm and an equally pre-served cannon bone measuring 295 mm in length are extant.

The majority of the unidentifiable fragments from Ageröd I:B investigated in 1971-73 measure 10-20 mm, the maximal length being 79 mm. A large number of the pieces measure less than 10 mm.

3. Preservation

The bone substance of the finds from Ageröd I:B (1971-73) is in general seriously weathered and several of the pieces are severely decalcified. Numerous pieces show mechanical wear on projecting edges (affected by swells in the water or damage caused by treading?).

The material is characterized by the high frequency of burnt pieces, grey or white in colour. Numerous pieces are charred.

Ratio of grey to white, burnt pieces of unidentified fragments: 1971 ca 60% 1972-73 ca 50%

Ratio of charred pieces of the unidentified fragments: 1971 ca 3% 1972-73 ca 3%

The above percentages indicate a high degree of loss of unburned pieces. Obviously, the calcareous substances sintered by heating could best withstand decalcification in acid embedment. The majority of remains might have disintegrated, or decomposed into small bits that were difficult to recognize.

4. Primary selection of the people inhabiting the settlements

Finds of bone artefacts provide evidence that certain skeletal parts, primarily cannon bones of certain species, first of all ungulates, were used as raw material for manufacturing artefacts, which may subsequently have been taken away from the settlements. Except for the bear bones, the anatomical distribution of the remains allows the conclusion that the majority of game animal carcasses were brought to the camps to be skinned and quartered there. Thus, there is no conclusive evidence of selection at the scene of the kill.

5. Secondary selection prior to embedment

a) Biological destruction

aa) Treading in the settlement: some of the mechanical wear and breaking asunder of bones may be due to this factor; although it seems of minor importance.

ab) The bones may have been gnawed by dogs or foxes. Due to the extensive fragmentation, no definite traces of biting can be demonstrated, but the presence of remains of dog is a strong indication that this kind of destruction was an essential factor causing damage all over the settlement.

ac) Gnawing by rodents as indicated by the presence of remains of water-vole.

ad) Minor skeletal parts may have been consumed or carried away by crows. There is reason to presume that at least the raven and probably also the crow pilfered the carrion.

b) Bones lying exposed for a longer period may have been soaked or cracked by solar heat or frost.

6. Secondary selection during incorporation.

a) Corrosion caused by contact with plant roots - this seems of minor importance.

b) Weathering of the calcium component of the bones caused by humic acids or, in the upper layers, even by frost. Fish-bone will be particularly affected by this factor due to its porous structure lacking lamellae. Thus, fish remains are probably very much under-represented compared to the relation existing originally.

7. Comments

The high degree of fragmentation and loss in measure and weight restrict the chances of identifying and precisely stating the quantitative relation of bones. The strikingly low percentage of identifiable bones (a mere 10%) is the consequence of fragmentation into minute bits. This is particularly the case when attempting to identify bird species. The ratio of bird remains as well as the number of bird species have surely been higher than what is demonstrated by the identifiable material. The serious loss may have reduced the number of less common and smaller species, particularly fish. As to the role played by fish, an analysis of fishing implements may therefore give better information than the identified fish remains themselves which are so few in number.

Because of the high degree of loss it would be extremely unrealistic to apply the customary method of calculating the lowest number of individuals. It would be equally impossible to join all the small bits of finds to the lowest number of bone entities. The weight distribution was also impossible to state. Consequently, the only remaining basis for a quantitative evaluation is the number of finds. Due to intrinsic sources of error (variability in the number of teeth and bones of different species, varying condition of breakage of bones depending on the size of the animals, differentiation in anatomical selection etc.) only extremely pronounced differences can be applied when attempting to draw conclusions about the role played by various animal species in the economy of the settlements.

The extreme fragmentation also limits the possibility of making a more thorough osteometrical characterization of the encountered species. The obtainable measurements will mainly be those of minor skeletal parts and widths of long bones.

Table LXXXVI. Distribution of species and find units. Pieces belonging together are indicated in parenthesis.

	AGERÖD I:B			AGERÖD I:D	
	Layer 1	Layer 2	Layer 3	D 1	D-site
1. Aurochs					
<u>Bos primigenius</u>		7		7(9)	16(18) 3
2. Elk					
<u>Alces Alces</u>		18-21		18-21(21+)	7 4(4)
3. Roe deer					
<u>Capreolus capreolus</u>		19-29		19-29(24+)	12 1
4. Red deer					
<u>Cervus elaphus</u>	3	46-73		49-76(164)	49 72
5. Wild boar					
<u>Sus scrofa</u>	1	37-58	2	40-61(54)	24 14
6. Wild cat					
<u>Felis silvestris</u>		1		1	
7. Badger					
<u>Meles meles</u>		1		1	1
8. Pine marten					
<u>Martes martes</u>					2
9. Brown bear					
<u>Ursus arctos</u>		4		4	1 1
10. Red fox					
<u>Vulpes vulpes</u>		3		3	
11. Beaver					
<u>Castor fiber</u>		12		12(6)	2(3) 2
12. Water vole					
<u>Arvicola terrestris</u>		1		1(6)	
13. Dog					
<u>Canis lupus f. familiaris</u>		4		4(31+)	2 14
14. Horse					
<u>Equus prezewskii f. caballus</u>	5			5	
15. White-tailed Eagle					
<u>Haliaeetus albicilla</u>					1
16. Goldeneye					
<u>Bucephala clangula</u>	1			1	
17. Unclassified birds					
Aves indet. ?		9		9(6)	
18. Pike					
<u>Esox lucius</u>		1		1	
19. Tench					
<u>Tinca tinca</u>		1		1	1
Classified	10	225	2	237	115 115

Anatomical selection

Aurochs, Bos primigenius Bojanus

Ageröd I:B, 1971-1973

dentes: 1(M fr.), os carpi: 1 (intermedium dext.), astragalus: 1 (sin.), phalanx: 1 (II).

Ageröd I:B, Berlin's classification

humerus: 1 (fr.), phalanx: 2(2 x II)

Ageröd I:D 1, Berlin's classification

atlas: 1 (fr.), axis: 2 (2 x fr.), vertebrae: 1 (vert. cervicalis fr.), costae: 7 (7 x fr.), radius: 1 (sin fr.),

metacarpus: 2 (2 x dect. 2 fr.), patella: 1, metatarsus: 1.

Ageröd I:D, Berlin's classification

dentes: 1(I), phalanx: 2 (II; III).

Measurements (in mm)

Because the bones were so fragmentary, only 2 finds are suitable for comparative measurements.

Os carpi intermedium

Top width: 38 (according to Stampfli, comparable measurements on 12 neolithic aurochs from the Swiss settlement Burgäschisee-Süd varied from 30 to 36).¹ Maximum height of dorsal side: 35 (on 12 aurochs from Burgäschisee-Süd the variation is 27-33).

Index $\frac{\text{width} \times 100}{\text{height}}$: 108.6 (corresponding values from Burgäschisee-Süd varied from 96.9 to 112).

Astragalus

	Ageröd	Burgäschisee-Süd (n=26)
Lateral length	87	76-88.5
Minimal length	68	
Distal width	59	

It is evident from the comparison that at least these two bones probably come from large aurochs, most likely from fully-grown bulls.

Elk, Alces alces (L.)

Ageröd I:B, 1971-1973

proc. cornu: 2, dentes: 10 (M₁ sin.; M₂ sin., M. fr., crown fr., M enamel fr., M fr.; M. crown fr., P, fr., P, not worn, crown fr., P⁴ sin., not worn; M. fr.), axis: 1 (fr.), astragalus: 1(sin.), calcaneus: 2 (sin. fr. with proc. coracoides, sin. without distalepiphysis), naviculocuboidum: 1 (sin.fr.), phalanx: 1 (I, proximal fr.).

For the following remains, the possibility that there might be some confusion with comparable parts of red deer cannot be completely ruled out:

radius: 1(fr.), femur: 1(fr.), tibia: 1 (fr.).

Ageröd I:D 1, Berlin's classification

dentes: 1 (P₂), costae: 1 (fr.), humerus: 1 (sin. fr.), os carpi: 1 (radiale), metacarpus: 1 (fr.), astragalus: 1, phalanx: 1 (II, fr.).

Ageröd I:D, Berlin's classification

radius: 1 (proximal fr.), tibia: 1 (fr. of a small animal - a young animal or cow), calcaneus: 1 (fr.).

Ageröd I:D, 1972

naviculocuboideum: 1 (sin.).

Measurements (in mm)

Due to heavy fragmentation, measurements are limited to the following 2 bones:

Astragalus

	Ageröd	<u>Recent Swedish elks in GNM:s collection</u>							
Lateral length	73	75.6	77.0	-	-	79.0	80.2	80.2	81.3
Minimal length	57	57.6	61.7	-	-	64.0	63.5	63.5	64.9
Medial length	67	70.8	72.0	73.5	73.6	74.4	74.0	75.4	77.2
Distal width	47	49.0	51.4	48.0	52.0	51.6	49.5	51.1	51.1

Naviculocuboideum

Maximal width: 56.3

Both bones, with relatively small measurements can come from a younger, not yet fullgrown animal.

Roe deer, Capreolus capreolus (L.)

Ageröd I:B, 1971-1973

proc. cornu: 5 (fr., processus cornualis sin. with the burr, processus cornualis with the buff and the beam, beam fr., burr fr., probably not a shed antler), mandibula: 1 (fr. of processus articularis), dentes: 3 (P₄ sin. not worn?, molar, crown fr., enamel fr.), costae: 1 (fr.), humerus: 1 (fr.), ulna: 1 sin., fr. with processus anconaeus), metacarpus: 2 (dorsal fr., volar fr.), femur s. tibia: 1(fr.), femur: 1(fr. caput femoris), tibia: 2 (fr., sin. loose distalepiphysis), naviculocuboideum: 1 (sin.), os tarsi: 1 (III dext.), astragalus: 1 (dext.), calcaeus: 2 (sin. fr., sin. fr.), metatarsus: 3 (2 x dorsal fr., fr.), os canaon: 2 (fr., trochlea), phalanx: 1 (proximal fr.).

Ageröd I:D 1, Berlin's classification

proc. cornu: 2 (fr., fr. with burr and beam), humerus: 2 (sin. distal fr., dext. distalfr.), radius: 1 (fr.), metacarpus: 1 (fr.), tibia: 4 (4 fr.), astragalus: 1 (sin.), phalanx: 1 (I, fr.).

Ageröd I:D, Berlin's classification

metatarsus: 1.

Measurements (in mm)

Cornua

Diameters of the pedicle (processus cornualis): 15.5 x 4.8
Diameters of the burr: 26.0 x 23.5

Tibia

Maximal distal width and length: 27.0 x 22.0

Astragalus

	<u>Ageröd</u>	<u>Recent Swedish roe deer in GNM:s collection</u>					
Lateral length	-	28.5	30.3	30.8	31.1	31.2	31.7
Minimal length	22+	23.5	23.7	24.1	24.6	25.2	25.5
Medial length	29+	27.4	28.4	28.3	29.4	29.0	29.5
Distal width	19	19.3	19.7	19.2	21.2	19.9	19.6

Naviculocuboideum

Maximal width 20.2 23.4 23.6 24.0 24.5 25.5

There is no marked difference in size (evident from these few measurements) between the finds from Ageröd and comparable parts of recent roe deer.

Red deer, Cervus elaphus L.

Ageröd I:B, 1971-1973

proc. cornu: 1 (basalsfr. of shed antler, 10 fr.), calvarium: 1 (fr. nasale), dentes: 21 (P² sin.; P² sin; P³ sin., M, M₂, M₃ dext. M₃ dext., molar, fr., molar, crown fr., 12 enamel fr., 2 crown fr., root fr.) axis: 1, scapula: 2 (fr. of proc. articularis dext.), humerus: 5 (2 x dext. distalfr., sin. supradistal volar-fr., fr., sin. laterosdistal fr.), radius: 1 (fr.), os carpi: 5 (intermideium dext., III dext., IV+V sin., 2 x radiale dext.), os coxae: 1 (dext. ilioacetabular fr.), femur: 2 (condylussfr., dext. loose caput femorisepiphysis), patella: 1 (dext.), tibia: 2 (dext. distalfr., sin. distalfr.), os malleolare: 2 (dext. fr., sin.), os tarsi: 1 (III sin.), metatarsus: 3 (sin. proximodorsal, 2 x dorsal fr.), os canon: 5 (fr., condylus, 3 x trochlea fr.), phalanx: 3 (II, proximal fr., distal fr.), os sesamoides: 1.

Ageröd I:B, Berlin's classification

proc. cornu: 1, dentes: 1 (P₂ dext.), astragalus: 1, calcaneus: 1 (fr.), naviculocuboideum: 1, phalanx: 1 (I fr.).

Ageröd I:D 1, Berlin's classification

proc. cornu: 1, calvarium: 8 (basisphenoideum, basioccipitale fr., occipitale: pars basilaris + partes laterales fr., occipitale: pars basilaris fr., condylus occipitalis fr., condylus occipitalis fr., processus jugularis fr.), dentes: 7 (3 x M, 2 x P₂ sin., I₃ dext. ♀, I, dext.), atlas: 3 (2 fr.), axis: 1 (fr.), costa: 1 (fr.), scapula: 2 (sin. fr., sin. distal fr.), humerus: 3 (sin distal fr., sin fr., fr.), radius: 1 (fr.),

ulna: 1 (fr.), os carpi: 3 (2 x radiale, intermedium), metacarpus: 1 (fr.), patella: 2 (fr.), tibia: 1 (fr.), astragalus: 2, calcaneus: 5 (3 fr.), naviculocuboideum: 1, metatarsus: 1 (fr.), os canon: 2 (2 fr.), phalanx: 3 (I, fr., II fr., fr.).

Ageröd I:D, Berlin's classification

calvarium: 2 (petrosum + condylus occipitalis, fr.), dentes: 4 (M³ fr., I₂ dext., 2 x P₂ sin.), os stylohyale: 1 (fr.), atlas: 1 (fr.), axis: 1 (fr.), vertebrae: 12 (verte cervicalis III fr., VII, verte cervicalis fr., 2 x vert. cervicalis, 6 x vert. thoracica, fr., vert. thoracica, processus spinosus, vert. lumbalis, fr.), costae: 10 (10 x fr.), humerus: 2 (dext. distal fr., proximal fr.), radius: 4 (juv., 3 x procimalfr.), ulna: 1 (fr.), os carpi: 1 (II+III), os pisiformes: 1, metacarpus: 1 (fr.), femur: 4 (2 x fr., proximalfr., distalfr.), patella: 1, tibia: 1, astragalus: 2, calcaneus: 1, naviculocuboideum: 1, os tarsi: 1 (II+III), metatarsus: 1, os canon: 2 (2 x fr.), phalanx: 15 (6 x I, 5 x II, 4 x III), os sesamoides: 2.

Measurements (in mm)

Dentes

Crown length of M₃: 32.5 (somewhat worn), 34.2 (half worn)
Ditto on Swedish red deers from the Boreal period according to Ahlén: 35-37.²
Ditto on Swedish red deers from the Atlantic period (Segebro and Arlöv I): 31.6-37.5.
Ditto on Swedish red deers from the present according to Ahlén: 26-32.³

As has already been emphasized by Ahlén subfossil red deers were larger than recent ones. The crown length of M₃ of Swiss red deers from Bugäschisee-Süd varies from 29.3 to 36.1.⁴ According to Jéquier the comparable variation among modern red deers from eastern Europe (Bialowieza and Siebenbürgen) is 26.2-36.0.⁵

Axis

Width of dens axis: 33
Ditto on neolithic red deers from Burgäschisee-Süd: 27-34.5
Ditto on modern red deers from eastern Europe: 24.5-35.⁶

Scapula

Length of processus articularis: 53
Ditto on Swedish red deers from the Boreal period: 53-69.⁷
Ditto on modern Swedish red deers: 49-61.⁸
Ditto on neolithic red deers in Switzerland: 51-72.⁹
Ditto on modern east European red deers: 57-65.¹⁰

Minimal length of collum: 32.5
Ditto on Swedish red deers from the Boreal period: 29-43.¹¹
Ditto on modern Swedish red deers: 31-41.¹²
Ditto on neolithic red deers in Switzerland: 29.5-44.¹³
Ditto on modern red deers from eastern Europe: 36-40.⁵¹⁴

One of the shoulder blades from Ageröd I:B seems to have come from a hind (or a young animal) judging from its relatively small measurements.

Humerus

Width and distal joint in the middle of the dorsal side: 49 54 55 62
Ditto on Swedish red deers from the Atlantic period (Segebro and Arlöv I): 47-53.2
Ditto on a Swedish neolithic red deer: 58.¹⁵

Here the smallest values from the Mesolithic would seem to indicate hinds.

Radius

Distal width: 49
Ditto on Swedish red deers from the Atlantic period (Segebro): 46.5-52.4
Ditto on neolithic red deers from Switzerland: 44-58.5.¹⁶
Ditto on modern red deers from eastern Europe: 49-59.¹⁷

Probably even these measurements from Ageröd come from a hind.

Tibia

Total length: 370 Distal width: 49 49.5

Ditto on modern Swedish red deers: 340 ♀ - 390 ♂ 46 ♀ 50-52 ♂¹⁸
 Ditto on Swedish red deers from the Boreal period: 40-55.¹⁹
 Ditto on Swedish red deers from the Atlantic period (Segebro, Arlöv I): 42.3-51.1

Astragalus

Lateral length 56.5 Distal width: 35
 Ditto on Swedish red deers from the Boreal period:
 52-64²⁰
 Ditto on Swedish red deers from the Atlantic period (Segebro, Arlöv I):
 (53)-59.8 31.6-36
 Ditto on modern Swedish red deers:
 51-54²¹
 Ditto on neolithic red deers from Switzerland:
 48-62.5 31-40²²
 Ditto on modern red deers from eastern Europe:
 57-58.5 36-37²³

Metatarsus

Total length 295 Distal width: 40.5
 Ditto on Swedish red deers from the Atlantic period (Segebro, Arlöv I):
 41-42.3
 Ditto on modern red deers in GNM:s collections:
 (260)-298 37-45
 Ditto on neolithic red deers from Switzerland:
 (277)-295 (36)-49²⁴
 Ditto on modern red deers from eastern Europe:
 301-311 40-48²⁵

In summary it can be said that the Mesolithic deers' maximal measurements reached higher values than the same measurements from comparable modern Swedish red deers. Their size approaches that of the large east European deers of today.

Wild boar, *Sus scrofa* L

Ageröd I:B, 1971-1973

calvarium: 1 (condylus occipitalis sin. fr.), dentes: 22 (M² dext., M³ dext., M fr., M slightly worn fr., 5 x I fr., I, I, sin. slightly worn, M₂ sin. not worn, M₃ fr., M₃ dext. fr., I, C sin. ♀, C dext. ♂, fr. C ♂, fr., C, crown fr., C fr.), costa: 1 (fr.), scapula: 1 (sin. fr.), humerus: 7 (sin, supradistal fr., sin. mediodistal fr., dext. laterodistal fr., dext. dorsolateral fr., sin. plantar fr., sin., supradistal fr., dorsal fr.), ulna: 2 (dext. fr. with proc. anconaeus, sin. fr.), metacarpale: 1 (sin. fr.), os carpi: 1 (intermedium dext. fr.), femur: 1 (fr.), patella: 1 (dext. fr.), tibia: 1 (sin. distal fr.), astragalus: 2 (sin., sin. fr.), os tarsi: 3 (centrale sin., IV+V dext. fr., IV+V sin. fr.), metapodium: 1 (distalephysis), phalanx: 3 (I, proximal fr., III, III proximal fr.).

Ageröd I:B, Berlin's classification

dentes: 7 (P⁴ sin., I₂ sin. from young animal, 2 x C fr., C, M fr., M fr.), astragalus: 1 (fr.), calcaneus: 3 (3 x fr.), os tarsi: 1 (centrale), metatarsale: 1.

Ageröd I:D 1, Berlin's classification

mandibula: 4 (fr. with M₃, 3 x mandibula fr.), dentes: 8 (I sin., 2 x C fr., 2 x C, 2 x M₃ fr.), atlas: 1 (fr.) scapula: 2 (fr. perhaps domestic pig, fr.), radius: 2 (distalepiphysis, fr.), ulna: 2 (fr., olecranon fr.), metacarpale: 1 (fr.), tibia: 1 (dext. medial fr.), calcaneus: 1 (from young animal), os tarsi: 1 (fr.), metatarsale: 1 (fr.).

Ageröd I:D, H. Berlin's classification

dentes: 5 (C, 2 x C fr., M₃, M fr.), costa: 1 (fr.), scapula: 1 (fr.), humerus: 2 (fr, sin distal fr.), radius: 1 (fr.), metacarpale: 1 (fr.), os coxae: 1 (fr.), calcaneus: 2 (2 x fr.).

Measurements (in mm)

Dentes

Crown length of M ³ :	42, 8
Ditto on Swedish mesolithic wild boars from the Atlantic period:	
a) Segebro:	43, 5-44
b) Arlöv I:	44-44, 7
Ditto on Swedish neolithic pigs from the Sub-boreal period (Äs in Västmanland):	36, 5-41 ²⁶
Ditto on neolithic wild boars from Switzerland:	36-(43) ²⁷
Ditto on central European wild boars from the present in GNM:s collections:	34, 5-38
Crown length of M ₃ :	40-44, 5
Ditto on Swedish mesolithic wild boars from the Atlantic period:	
a) Segebro:	41 47, 2 48, 8
b) Arlöv I:	45, 7 46 47
Ditto on Swedish neolithic pigs from the Sub-boreal period:	
a) Rörvik in Bohuslän:	41
b) Äs in Västmanland:	36, 5 39 39, 5
Ditto on neolithic wild boars from Switzerland:	40-49 ²⁸
Ditto on central European wild boars from the present in GNM:s collections:	38, 6-39

Mesolithic wild boars in both Sweden and central Europe are notable for their remarkable size (labelled by Rüttimeyer as "antiquus"-form).²⁹ Similar measurements are reached today only among east European populations.

Humerus

Middle width of the dorsal joint surface of the trochlea:	38
Ditto on Swedish mesolithic wild boars from the Atlantic period:	
a) Segebro	41, 5 43
b) Arlöv I	37, 2 39 39, 4
Ditto on Swedish neolithic pigs from the Sub-boreal period (Äs in Västmanland):	31 37 38 38, 2 ³⁰
Ditto on modern central European wild boars from GNM:s collections:	33, 5

Tibia

Distal width:	35
Ditto on Swedish mesolithic wild boars from the Atlantic period:	34
Ditto on neolithic wild boars from Switzerland:	33-42 ³¹
Ditto on modern central European wild boars in GNM:s collections:	34 ♀ 36 ♂

Astragalus

Lateral length	51, 5
Medial length	47
Distal width	29
Lateral length on Swedish mesolithic wild boars from the Atlantic period:	
a) Segebro:	43, 7 51, 8 54, 7 56
b) Arlöv I:	48, 2 50
Ditto on Swedish neolithic pigs from the Sub-boreal period:	
a) Rörvik in Bohuslän:	54
b) Äs in Västmanland:	49-52
Ditto on neolithic wild boars from Switzerland:	46-(55, 5) ³²
Ditto on modern central European wild boars in GNM:s collections:	44 51, 2

Wild cat, Felis silvestris Schreber

Ageröd I:B, 1972-1973

radius: 1 (dext. proximal fr.).

Measurements (in mm)

Radius

Proximal width and depth: 8.9 x 6

Badger, Meles meles (L)

Ageröd I:B, 1972-1973

mandibula: 1 (mandibula dext. fr. with fossa masseterica).

Ageröd I:D 1, Berlin's classification

mandibula: 1.

Ageröd I:D, Berlin's classification

mandibula: 1

Measurements (in mm)

Mandibula

The greatest thickness of margo inferior between the last alveol and fossa is strikingly large: 8. (Ageröd I:B). This indicates a very large animal.

Pine marten, Martes martes (L.)

Ageröd I:D, Berlin's classification

cranium: 1 (fr.), radius: 1 (dext., distal fr. probably ♂).

These parts can come from a hide.

Brown bear, Ursus arctos L.

Ageröd I:B, 1971-1973

dentes: 4 (M¹ dext., M₁ dext. mesial fr., C sin.), phalanx: 1 (I proximal fr.).

Ageröd I:D 1, Berlin's classification

metacarpale: 1 (fr.).

Ageröd I:D, Berlin's classification:

humerus: 1 (sin. fr.).

Measurements (in mm)

Dentes

Maximal diametre of length and width of C: 26.5 x 15.

Crown length and width of M¹: 24.5 x 17.

The measurements above indicate fairly strong bears.

Red fox, Vulpes vulpes (L.)

Ageröd I:B, 1971-1973

dentes: 2 (M¹ sin., worn, M₁ sin.), metacarpale: 1 (distal fr.).

Measurements (in mm)

Dentes

Crown length of M¹: 11.3
Crown length of M₁: 15.5

Beaver, Castor fiber L.

Ageröd I:B, 1971-1973

dentes: 12 (3 x I, 7 x M, 2 x fr.).

Ageröd I:D 1, Berlin's classification

dentes: 1 (fr.), mandibula: 1 (fr.).

Ageröd I:D, Berlin's classification

dentes: 1 (M), mandibula: 1 (fr.).

Water vole, Arvicola terrestris (L.)

Ageröd I:B, 1971

dentes: 1 (I fr.).

Dog, Canis lupus f. domesticus

Ageröd I:B, 1971-1973

mandibula: 1 (mandibula sin. with P₂-M₂ with fossa masseterica and fr. of processus articularis),

dentes: 2 (M₁ sin. slightly worn, M₁ dext. not worn), atlas: 1.

Ageröd I:D 1, Berlin's classification

dentes: 2 (P₄ dext. fr., C sin. root fr.).

Ageröd I:D, Berlin's classification

mandibula: 2 (mandibula dext., sin. P₂-3 missing), axis: 1, vertebrae: 4 (vert. cervicalis VII fr., vert. thoracica fr., vert. thoracica fr., vert. lumbalis VII fr.), scapula: 2 (2 x sin.), ulna: 1 (sin.), fibula: 1 (fr.), calcaneus: 1 (dext.), metatarsale: 1 (II sin.).

Ageröd I:D, 1973

atlas: 1

Horse, Equus przewalskii (f. caballus L.)

Ageröd I:B 1973

dentes: 5 (P⁴ dext. fr., P⁴ sin. fr., M¹ dext. fr., M¹ sin. fr., M² dext. fr.).

White-tailed eagle, Haliaeetus albicilla

Ageröd I:D, 1972

femur: 1 (fr.).

Goldeneye, Bucephala clangula (L.)

Ageröd I:B, 1972

os synsacrum and os coxae: 1 (dext.fr.).

Unclassified bird bones probably from Anatidae

Ageröd I:B, 1972-1973

radius: 1 (fr.), ulna: 2 (2 x fr.).

Pike, *Esox lucius* L.

Ageröd I:B, 1973

mandibula: 1 (dentale dext. symphus fr.).

Estimated total length

As the estimate is based on a burnt and therefore shrunken fragment, the total length cannot be accurately established. The fish was probably 50 cm long.

Tench, *Tinca tinca* (L.)

Ageröd I:B, 1973

os pharyngeum: 1 (inferior sin. fr.).

Ageröd I:D 1, Berlin's classification:

operculare: 1.

Estimated total length

The find from Ageröd I:B comes from a 30-35 cm long fish.

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